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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G06F 155/00, 161/00 — A1

(11) International Publication Number: WO 95/24689

(43) International Publication Date: 14 September 1995 (14.09.95)

(21) International Application Number: PCT/US95/02939

(22) International Filing Date: 7 March 1995 (07.03.95)

(30) Priority Data:

08/212,348	11 March 1994 (11.03.94)	US
08/269,248	30 June 1994 (30.06.94)	US

(81) Designated States: AM, BG, BY, CZ, EE, GE, HU, KG, KZ, LT, LV, MD, MG, MN, MW, PL, RO, SD, SI, SK, TJ, UA, UG, UZ, VN.

Published
With international search report.

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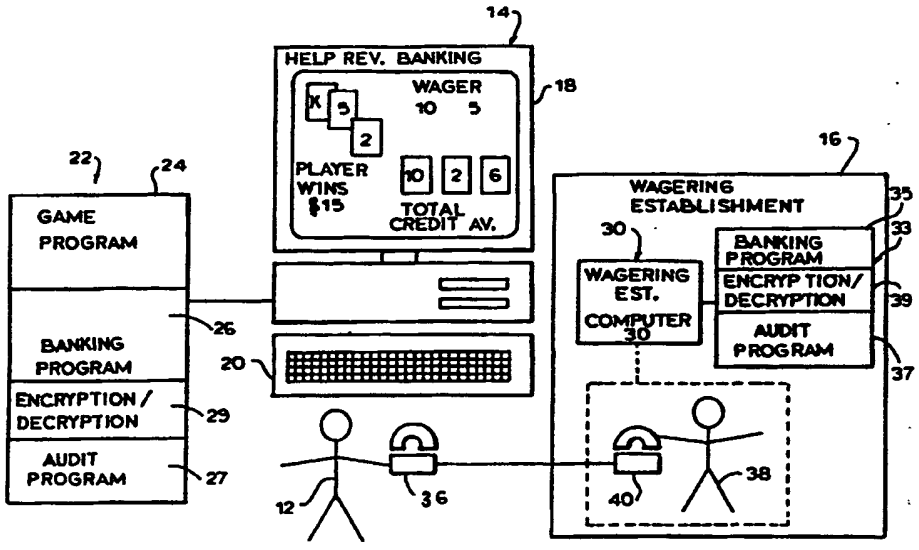
(54) Title: IMPROVED REMOTE GAMING SYSTEM



(57) Abstract

A remote gaming system whereby a player (12) can gamble against a wagering establishment (16) or lottery from a remote location on a personal computer or portable computer device (14) where it is unnecessary to establish an on-line connection with a host computer associated with the wagering establishment, the gaming computer providing at least one wagering opportunity and enabling the player to obtain credit and cash-out any winnings, the host computer (30) enabling the player to purchase and redeem credit at the remote location through a series of encrypted code exchanges between the player and the wagering establishment, or alternatively the gaming computer or a credit module for use with a personal computer being provided to the player with pre-installed credit.

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IMPROVED REMOTE GAMING SYSTEM

This Application is a continuation-in-part of copending Application Serial No. 08/212,348, filed on March 11, 1994.

BACKGROUND

1. Field of the Invention

The present invention relates generally to a remote gaming system, and more particularly, to a remote gaming system by which a player can wager on a plurality of games of chance and/or future public events of which the outcome is uncertain, offered by a casino, government lottery organization, or other wagering establishment.

2. Description of the Prior Art

In the past, a player wishing to wager on a game of chance such as those offered in a casino or on a public event of which the outcome is uncertain such as sporting events, had a limited number of options. In order to wager on casino games such as roulette, blackjack, poker and the like, the player had to physically travel to a gaming establishment specifically engaged in such activities or to a location where stand-alone gambling devices such as video poker terminals or slot machines were available. Although public events such as horse races may be wagered on by telephone contact with an authorized "off-track betting" gaming establishment or its agent, such methods utilizing telephone contact have not been amenable to typical casino games.

As a result of advances in computer technology and telecommunications, remote gaming systems have been devised in which a player can participate in a

plurality of games of chance being offered by a gambling establishment without having to be physically located on the premises. An example is found in U.S. Patent Nos. 4,339,798 and 4,467,424, both to Hedges et al. The Hedges Patents disclose a remote gaming system wherein a player proceeds to gamble against the casino at a remote player station which includes a live game display to permit the player to engage in actual games of chance as they are being played in real-time at a croupier station comprised of one or more gaming tables in the casino. The player station includes a changeable keyboard communicating with a microprocessor for displaying a selected one of a plurality of wagering possibilities corresponding to a selected one of the plurality of games being played and for displaying the results of the game being played. The player becomes part of the game as if he or she were actually present at the gaming table in the casino. To provide a secure communications link, the remote gaming station communicates with the croupier station and a credit control station through an encryption/decryption device to prevent tampering by unauthorized sources.

While such a system provides a means by which a player can gamble from a remote location, its primary disadvantage resides in the fact that the player can gamble only by participating in games being actually conducted in the gaming establishment and monitored over real-time closed circuit video. Moreover, such a system has limited practicality since the player can only gamble on a specialized gaming station which must be electronically linked to the casino. It would therefore be highly desirable to provide a remote gaming system by which a player could engage in gambling on a gaming computer at a remote location at the player's convenience where the casino

provides for the purchase and redemption of casino credit, notwithstanding the absence of any direct electronic communication link between the gaming computer and the casino.

Accordingly, it is an object of the present invention to provide a remote gaming system by which the player can wager on any one of a plurality of games of chance typically offered by a wagering establishment (e.g., a casino) at the player's convenience.

It is another object of the present invention to provide a remote gaming system by which the player can wager against the wagering establishment on any one of a plurality of wagering opportunities such as games of chance generated by computer software on any personal computer.

It is a further object of the invention to provide a remote gaming system by which a player can wager against the wagering establishment on a conventional multi-media apparatus (e.g., a Nintendo apparatus coupled to a television set) through compatible plug-in data storage media.

It is yet another object of the invention to provide a remote gaming system by which a player can purchase and redeem wagering credit from remote locations without the need for an electronic communications link to be established between the player's gaming computer and the wagering establishment.

It is still another object of the invention to provide a remote gaming system by which a player can wager on any one of a plurality of games of chance generated on a dedicated gambling computer, including a hand-held portable device, which can be provided to the player, yet need not be electronically linked to the wagering establishment for purposes of gambling,

and/or purchasing and redeeming wagering credit.

It is yet another object of the invention to provide a remote gaming system wherein encryption and decryption of codes transferred between a remote gaming computer and the wagering establishment, either on-line (including wireless electronic communication hardware) or off-line (orally with an agent or electronic communications over the telephone, but where no connection is necessary between the gaming computer and the wagering establishment), prevents unauthorized users from gaining access to or fraudulently obtaining or redeeming wagering credit.

It is still another object of the invention to provide a remote gaming system by which a player receives a tamper-proof read/write device from the wagering establishment containing data storage media for dedicated gaming software which can be linked to any personal computer, yet prevents unauthorized manipulation of the software.

It is still another object of the invention to provide a remote gaming system in which the gaming and/or banking software is embodied in a computer disk where the unique magnetic signature of that disk is readable by the disk drive in the gaming computer for encryption to make detectable unauthorized duplication of the disk.

It is still another object of the invention to provide a remote gaming system by which a player can wager on future public events of which the outcome is uncertain such as a lottery, either through an on-line connection between a gaming computer and the gambling establishment, or off-line where the player's wager is time-stamped to generate an encrypted registration code, representing the player's choice of wagering elements (i.e., numbers) for a given lottery event (occurring at some time in the future), which

code is known only to the lottery authority.

It is yet another object of the invention to provide a remote gaming system by which a player can obtain and redeem wagering credit from the wagering establishment embodied in tamper-proof physical data memory media which interface with a remote gaming computer.

It is still another object of the invention to provide a remote gaming system by which a completely self-contained dedicated gambling personal digital assistant may be obtained with a preprogrammed and predetermined amount of non-renewable credit.

It is a further object of the invention to provide a remote gaming system by which a player can engage in a game of skill (e.g., a crossword puzzle) made available on a dedicated gambling personal digital assistant having a preprogrammed and predetermined amount of non-renewable credit.

It is still another object of the invention to provide a remote gaming system in which a premium application enables a player who purchases a product such as a computer, or software on data storage media, to win something as determined by the output of a gaming program embedded within such product.

It is yet another object of the invention to provide a remote gaming system by which a player wagering at a remote location is subject to predetermined limitations on winnings by a wagering establishment.

SUMMARY OF THE INVENTION

In accordance with the above objects and other objects which will become apparent hereinafter, the present invention provides a remote gaming system which enables a player to gamble against a wagering establishment using a gaming computer at a remote location. The gaming computer may or may not be

electronically linked (i.e., "on-line") to a wagering establishment computer while gambling takes place. The gaming computer can be any personal computer, hand-held computer device (e.g., a personal digital assistant), or multi-media apparatus which functions as the gaming computer (e.g., a nintendo or like apparatus) and may or may not be a dedicated gambling computer provided by the wagering establishment. If provided by the wagering establishment, the gaming computer is pre-loaded with gaming software. If the gaming computer is a conventional personal computer, the gaming software is either pre-installed on a secure data storage media device (e.g., a hard disk, CD-ROM, etc.) or module provided by the wagering establishment or installed directly on the computer by the player.

The gaming software includes a game program and a banking program. The game program generates a plurality of games of chance typically offered by the wagering establishment (e.g., blackjack, roulette, craps, poker, slots, etc.), or makes available wagering on future public events of which the outcome is uncertain (e.g., a lottery). The banking program provides for the purchase or loading of credit, from the wagering establishment to enable gambling and increments or decrements the player's account balance to enable the player to cash-out any gambling winnings. The gaming software may also include an audit program which records the outcome of each wager and transactions between the player and the wagering establishment as entered into and output from the gaming computer to purchase and redeem credit.

The wagering establishment computer includes a banking program which enables the player to purchase and redeem wagering credit at the remote location, even if no on-line communications are established with

the gaming computer and an audit program for recording such transactions. This may be accomplished through a plurality of encrypted code exchanges which take place between the player and the casino, either by oral communications between the player and an agent of the casino, or by communications between the player and an automated answering service at the casino (i.e., using a touch-tone phone), or by providing credit "built-in" or pre-installed on a tamper-proof module for installation on a conventional personal computer, or pre-installed on a dedicated gaming computer provided by the wagering establishment. In the off-line embodiment, the automated "agent" is associated with the wagering establishment computer but there is no direct electronic connection between the gaming computer and the wagering establishment computer. Encryption provides a means by which such exchanges are made secure to prevent a third party from gaining unauthorized access or fraudulently obtaining or redeeming such credit.

If the gaming computer is networked to the wagering establishment computer, the connection may or may not serve to regulate or control the gaming software simulation of casino games on the gaming computer. For example, the connection may serve to have the wagering establishment computer keep a record of all or selected activities taking place at the gaming computer for purposes of additional verification or security. Alternatively, the connection may be of a controlled nature to vary the odds of a given wager based upon any of a variety of factors such as gambling duration or a progressively increasing jackpot (e.g., in a slot machine simulation). In such an on-line embodiment, security and player verification can be obtained by utilizing a stand-alone encryption device such as commonly

employed in wireless money transfers. This device generates an encrypted verification code based upon the user's personal identification code and a second code provided to the user by the casino or stored in the stand-alone encryption device to prevent an unauthorized user from obtaining on-line access upon having stolen a user's personal identification code.

At all times, each wager by the player generates an encrypted electronic audit-trail on the gaming computer and/or on any networked computers by recording the amount of each wager, the outcome of each gambling event and any resulting gambling earnings or losses. The financial resolution of each wager is cumulatively tracked by the software on the gaming computer and perhaps also on any networked computers and the player is able to constantly monitor his casino credit balance.

A player gambles in substantially the same way he or she does in a casino. The player chooses which games to play as presented by the gaming software, the amount of each wager and the length of time each game is played. The player may remain active over several different gaming sessions which may take place at several different times and/or places. The player may at any time place wagers which are for practice only which do not affect the player's wagering credit balance. As an option, the player's wagering credit balance may be transferred and stored on data storage media which can be installed on other computers where software has been or can be installed to recognize the player's wagering credits and credit balance. The player may then continue to wager on any of such other computers. At any time the player wishes to cash-out his or her wagering credits or winnings, they can be redeemed from the wagering establishment by contacting the wagering establishment either by telephone in an

off-line embodiment, or by direct electronic communication in an on-line embodiment. In one embodiment described above, a series of encrypted codes are then exchanged with the wagering establishment, either by telephone or transmitted electronically. In the off-line embodiment, these codes are generated by the gaming computer software and the casino computer software to verify the player's identity prior to cashing-out gambling winners. In the on-line embodiment, a stand-alone encryption device generates an encrypted log-on or confirmation code for verification. Alternatively, where the gaming computer itself (e.g., a personal digital assistant) is provided to the player by the wagering establishment, it or a tamper-proof plug-in module may be physically returned to the wagering establishment for credit redemption. Such credits can be redeemed from the wagering establishment in any of a variety of forms of payment including but not limited to cash, bank-wire transfers, credits or some other form of payment mutually agreed to by the player and the wagering establishment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a schematic view of the remote gaming system in a first off-line embodiment;

FIG. 1B is a schematic view of the remote gaming system in a second off-line embodiment;

FIG. 1C is a schematic view of the remote gaming system in a third off-line embodiment;

FIG. 2 is a schematic view of the remote gaming system in an on-line embodiment;

FIG. 3 is a schematic view of a gaming computer connected to a tamper-proof read/write data storage media device provided by the casino;

FIG. 4 is a flowchart of the start-up and registration sequence in the off-line embodiment;

FIG. 5 is a flowchart of the handshake recognition sequence in the off-line embodiment;

FIG. 6 is a flowchart of the purchase credit sequence in the off-line embodiment;

FIG. 7A is a flowchart of the wagering sequence for games of chance generated by the game program in the off-line embodiment;

FIG. 7B-1-2 is a flowchart of the wagering sequence for an off-line non-registered lottery system embodiment;

FIG. 7C-1-5 is a flowchart of the wagering sequence in an off-line registered lottery system embodiment;

FIG. 8 is a flowchart of the credit cash-out sequence in the off-line embodiment;

FIG. 9 is a flowchart of the registration and start-up sequence in the on-line embodiment;

FIG. 10 is the purchase credit sequence in the on-line embodiment;

FIG. 11 is a flowchart of the wagering sequence in the on-line embodiment;

FIG. 12 is a flowchart of the credit cash-out sequence in the on-line embodiment;

FIG. 13 is a schematic of a memory chip made secure by an external tamper-proof structure;

FIG. 14 is a schematic of a first means for verifying the integrity of the gaming software;

FIG. 15A is a schematic of a second means for verifying the integrity of the gaming software;

FIG. 15B is a schematic of a third means for verifying the integrity of the gaming software;

FIG. 15C is a schematic of a fourth means for verifying the integrity of the gaming software; and

FIG. 15D is a schematic of a fifth means for verifying the integrity of the gaming software.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the several views of the drawings, there is depicted a remote gaming system generally characterized by the reference numeral 10 in which a player 12 with access to a computer 14 ("the gaming computer") wagers on a plurality of games of chance or on future public events where the outcome of such events is uncertain, offered by a casino, government lottery organization or other wagering establishment 16. For convenience, these will be generally referred to herein as "the wagering establishment".

Referring now to FIG. 1A, player 12 has access to gaming computer 14 having a video display 18 and a keyboard 20. Gaming computer 14 can be a personal home computer, lap-top, or hand-held personal digital assistant device which may or may not be a dedicated gaming apparatus provided by wagering establishment 16 or a multi-media apparatus (e.g., a nintendo or similar device for use with a television or the like). Gaming computer 14 can be located either off-site at a remote location, at wagering establishment 16 or some other establishment (e.g., a lottery ticket vendor). A gaming computer 14 located at the wagering establishment 16 can still be classified as "remote" for the purpose of the disclosure and claims herein. It is anticipated that a casino could provide players, in for example, the hotel where the casino is located, with a dedicated gaming computer 14 which could be used to gamble within and outside of the physical boundaries of the casino. A primary advantage of providing player 12 with a wagering establishment-furnished gaming computer 14 is greater security, specifically with regard to making unauthorized access to the data storage media such as a computer disk drive or module more difficult. Moreover, in a dedicated gaming

computer, the keyboard 20 can be customized with specialized function keys identifying commands (e.g., keys dedicated to blackjack might have indicia stating "hit me", "stand", "purchase insurance", etc.) which the player selects to proceed to gamble on the various games of chance being offered by the wagering establishment 16. Gaming computer 14 operates special gaming software 22 comprised of a game program 24, a banking program 26 and optionally, an audit program 27. Gaming software 22 can be pre-installed on a dedicated gaming computer 14 provided by the wagering establishment 16, pre-installed in a tamper-proof read/write data storage media device 28 provided by wagering establishment 16 which interfaces with a personal computer functioning as the gaming computer 14 as shown in FIG. 3, or installed directly on the personal computer by the player. Furthermore, the gaming software 22 may be made available on a tamper-proof plug-in data storage media module for use with a conventional multi-media apparatus which functions as the gaming computer 14, to be described in more detail hereinbelow.

It is critical that the wagering establishment 16 be able to determine if the software itself or data thereon was copied, tampered with or in any way altered, otherwise a player could make a plurality of copies and keep playing with identical disks until such time that one of the copied disks was a winner, or the player could alter the software itself in an attempt to control the outcome, the winnings or losses, or a combination thereof, i.e., a dishonest player 12 modifies the software code of the gaming software 22 in such a way as to make the software generate a winning outcome more frequently than chance would dictate (e.g., in a roulette simultation, causing the roulette wheel to land on a more favorable

number more frequently). This could be achieved by replacing the software in its entirety or by modifying certain code lines of the program, either physically or by some other externally applied influence such as high-intensity electromagnetic radiation (e.g., an RF field). Of course, the most secure system is an on-line arrangement where the gaming software 22 resides in a gaming computer 30 on the premises of the wagering establishment (FIG. 2). The most difficult security issues with regard to tampering arise in embodiments where the wagering establishment provides the player 12 with software for use on a remotely disposed gaming computer 14 or with a dedicated gaming computer 14 itself (e.g., a PDA). In this connection, a variety of means for ensuring security may be provided.

In one application, software directing the gaming computer through the disk drive to read the unique magnetic signature of the specific disk on which gaming software 22 is made available for installation, and encrypt the same for decryption by the wagering establishment can reveal unauthorized duplication of data on that disk. Alternatively, a plug-in device can interface with the disk drive to read a portion of the disk to acquire the unique magnetic signature of the disk. This encrypted data can be registered with or required by the wagering establishment 16 prior to cashing out.

In another embodiment as shown schematically in FIG. 13, the gaming software 22 resides on a chip 23 disposed within the gaming computer 14 (i.e., where a dedicated device is provided by the wagering establishment 16). The chip 23 could be situated within a physical casing 84 which is isolated and unaccessible from any external data port connection. In an exemplary embodiment, the chip 23 can be housed

within special seals, insulation, wrapping, or the like 86 to reveal any authorized attempts to remove or tamper with the chip 23. Thus, the wagering establishment 16 can readily ascertain if the player tampered with the gaming software and, if such tampering is discovered, it could deny such player any claimed winnings and/or future credit.

In yet another embodiment shown schematically in FIG. 14, unique mathematical attributes are derived from certain characteristics of the software code in a self-test process. To perform such a test, the characteristics of the code are kept secret and known only to the wagering establishment 16 (e.g., a check-digit type algorithm based upon the sum of the bits located in, for example, lines 476 through 655 of the code). Alternatively, the self-test can verify special codes which are embedded within the code instructions in some predetermined random manner known only to the wagering establishment 16.

In a variation of the above as shown schematically in FIG. 15A, external keys known only to the wagering establishment 16 can be applied to intermittently or continuously verify whether the software code has been or is being tampered with by causing altered software to malfunction and shut down the gaming application in the computer 14. This can be implemented in several ways, including, but not limited to: (1) broadcasting a continuous encoded or encrypted external signal (e.g., RF) from the wagering establishment 16, received by receiving means 88 in the gaming computer where such signals are subsequently decoded or decrypted by the gaming computer 14 and input to the gaming software 22 (FIG. 15B); (2) having the player 12 physically enter a code on an intermittent basis (FIG. 15C); or (3) utilizing an internally generated clock signal provided by a

tamper-proof clock 89 (FIG. 15D). In this connection, the chip 23 or even the gaming computer 14 (if provided by the wagering establishment 16) may be shielded from electromagnetic interference to prevent unauthorized attempts to influence the gaming software with electromagnetic radiation. The use of external keys may or may not employ encryption to safeguard against their being somehow forged by the player 12.

Aside from the use of external keys, the gaming software 22 can be made to require the acquisition of data from an external source in order to function. For example, a wireless broadcast or like stream of random numbers (possibly encrypted) might be accessed by the gaming software 22 such that these random numbers are called upon by the program as a basis to select a wagering outcome in a predictable or unpre- dictable manner. Such external input may be incorporated into a tamper-proof plug-in device or module which interfaces with the gaming computer 14.

Another way to prevent fraudulent attempts to alteration of the gaming software 22 is the use of an audit program 27 which can only be accessed by the wagering establishment 16. To prevent a forged audit trail, the audit program 37 might, by way of example, create dozens or even hundreds of data strings (e.g., such as in a roulette simulation, data strings corresponding to spins of the roulette wheel each time the wheel is spun) where all such data is then recorded for future verification should the wagering establishment 16 suspect tampering with the gaming software 22.

It will be appreciated by persons skilled in the art that the gaming software 22 can be arranged such that a data-string of alphanumeric codes, either pre-loaded into each gaming computer 14, provided on a disk or alternatively furnished on a plug-in

uncopyable module, can be used to discover any tampering with the software, disk or module by the player 12. In this connection, the code sequence can be made different for each gaming computer 14 or module and copies of such codes can be kept by the wagering establishment 16. These codes can provide the basis for randomness in the outcome of each gaming event, and can thereby provide evidence of tampering. In other words, a specific arrangement of codes might correspond to a certain outcome of a wagering event (e.g., the Roulette wheel lands on "5"). Even though these codes are known to the wagering establishment 16, they are sequenced to ensure a random outcome - something which could be verified by an independent third party. If a player 12 seeks to modify the gaming software, the altered software codes could be discovered upon comparison of the same with the originals known only to the wagering establishment 16.

As another means of preventing player fraud, an element of "double-randomness" can be implemented by requiring the player 12 to press a button for each selection or desired response on the gaming computer 14 twice, with the time interval between selections (i.e., in milliseconds) used to address a specific preprogrammed random outcome codified in corresponding software codes.

Game program 24 permits player 12 to wager on any one of a plurality of wagering opportunities, including games of chance, future public events where the outcome is uncertain or games of skill (e.g., a crossword puzzle). The games of chance are created on gaming computer 14 by game program 24 in accordance with conventional techniques and include, but are not limited to, common casino wagering activities such as blackjack, craps, roulette, poker, slots or the like.

Each game offers opportunities for player 12 to place wagers on one or more various wagering elements within a given wagering event depending upon the rules applicable to that game. This will be described in more detail below.

Game program 24 can be made to accept wagers on future public events where the outcome of such events are uncertain as in, for example, sporting events such as a football game or a boxing match, or a state-run or other lottery. This can be implemented by establishing communications orally or electronically with the wagering establishment 16 in order to place, register and confirm bets. The wager is placed on the gaming computer 14, which produces a code for registration with the wagering establishment 16. This code is then time stamped by the wagering establishment 16 to form an encrypted code using appropriate software instructions to lock in the bet or fix the time of the wager for the purpose of ascertaining the proper payoff. This implementation will be described in detail below. Similarly, games of skill such as a crossword puzzle can be implemented where a date/time stamp fixes the time of completion such that prizes are later awarded based upon the first player to complete the game.

Banking program 26 enables player 12 to wager with available credit, and "cash-out" in order to redeem any gambling winnings. In certain embodiments, the banking program 26 facilitates the purchase of credit from the wagering establishment 16 where such credit is "loaded" into the gaming computer in the form of codes. Alternatively, as shown in FIG. 1C the banking program can receive instructions from an electronic card reader 91 compatible with credit or debit cards 93 in a conventional manner, or the banking program can receive credit from a plug-in

credit module 90.

As one way of ensuring security in the credit purchase/redemption procedure, banking program 26 or a dedicated encryption/decryption device provides, for example, an encryption and decryption algorithm 29 of the type known in the art (e.g., utilizing a public-key) to encrypt and decrypt certain alphanumeric codes exchanged between player 12 and casino 16 which are input to and generated by playing computer 14 and the wagering establishment computer 30. These codes are exchanged between player 12 and an agent of the wagering establishment 38 through telephone 40. The term "agent" is intended to include an automated telephone or like system which generates computerized instructions for communication to player 12 by means of a touch-tone telephone 36 to prompt player 12 to communicate responses to the wagering establishment 16 by pressing the appropriate numbers or symbols. Such generated instructions can be provided by the wagering establishment computer 30 over the telephone in accordance with well-known techniques.

The wagering establishment computer 30 has gaming software 33 which includes a banking program 35 and audit program 37. The computer 30 either includes or communicates with a dedicated device or software for implementing an encryption and decryption algorithm 39 known only to the wagering establishment 16 to encrypt and decrypt these codes. In this manner, the wagering establishment 16 enables a verified player 12 to purchase and redeem wagering credit at the remote location. The sequence of steps to purchase and redeem such credits by exchanging encrypted codes are described in greater detail below.

In the usual course of practicing the invention, FIG. 4 depicts a flowchart of the start-up

and registration sequence in an off-line embodiment which must occur prior to wagering. Player 12 first registers various personal information with wagering establishment 16 and obtains an alphanumeric personal identification code 32. The wagering establishment 16 provides player 12 with gaming software 22 comprised of game program 24 and banking program 26 as described above, accompanied by an alphanumeric software identification code 34. Gaming software 22 may be independently tested, verified and provided on data storage media in a sealed envelope by a third party. Such data storage media can include a hard disk, floppy disk, CD-ROM and the like. The wagering establishment 16 then provides an alphanumeric start-up identification code 33 which player 12 enters to actuate the gaming software 22. Optionally, the gaming computer 14 may include voice recognition means such as a voice chip or voice recognition software for recognizing the unique characteristics of the player's voice to deny access to any unauthorized user. Such hardware and/or software is known in the art. Gaming software 22 is programmed to prompt player 12 with an inquiry as to whether the current session is for practice or to place a wager. If it is a practice session, game program 24 generates a plurality of game choices and a confirmation that the games are being played for practice only. If player 12 chooses to engage in gambling, banking program 26 will permit actual wagering to the extent that there are sufficient wagering credits available in the player's account. If there are insufficient credits, player 12 must contact the wagering establishment 16 and go through the purchase credit sequence described below. As noted above, gaming computer 14 may or may not be on-line with the wagering establishment computer 30. If gaming computer 14 is off-line, greater flexibility

in terms of being able to engage in gambling at virtually any location is possible. In an exemplary embodiment, a series of encrypted communication exchanges of, for example, alphanumeric codes, between player 12 and the agent 38 permit credit purchase and redemption at a remote location to be governed by the wagering establishment 16 notwithstanding the absence of an electronic link between the gaming computer 14 and the wagering establishment computer 30.

Alternatively, gaming computer 14 can be networked to the wagering establishment computer 30 through the communications link 29 such that computer 30 monitors and controls all or part of the activities taking place on the remote gaming computer.

In the off-line embodiment shown in FIG. 1, player 12 places a call to the wagering establishment 16 by way of telephone 36 and communicates with agent 38 through telephone 40 to obtain or redeem gambling credit. If player 12 already has credit, gaming software 22 will permit wagering on any of the games of chance provided by game program 24 upon receiving player 12's personal identification code 32. If player 12 requires credit to play, the wagering establishment 16 must be contacted and the following series of steps are followed for the purpose of verifying the player's identity and confirming that the player is utilizing gaming software 22 registered to his or her personal identification code 32.

Whenever player 12 contacts the wagering establishment 16, he or she goes through what is referred to as a handshake recognition sequence, the verification of the player's identity with the wagering establishment. In this regard, as depicted in the flowchart of FIG. 5, player 12 first calls the wagering establishment 16 on telephone 36 and agent 38 who communicates through telephone 40, queries player

12 for his or her unique personal identification code 32 and software identification code 34. Agent 38 enters these codes into the computer 30 which generates an encrypted handshake code 42 which is provided to player 12 for entry into gaming computer 14. Gaming computer 14 decrypts handshake code 42 and then generates an encrypted recognition response code 44 which is then provided to the wagering establishment 16. Agent 38 enters recognition response code 44 into computer 30 which decrypts recognition response code 44 to verify player 12's identity and confirm that the specific gaming software 22 registered to player 12 is in use. Verified player 12 then proceeds with appropriate casino interaction.

FIG. 6 is a flowchart depicting a first embodiment of a purchase credit sequence in the off-line embodiment. Player 12 first contacts the wagering establishment 16 and establishes his or her identification through the handshake sequence depicted in FIG. 5 and described above. Agent 38 obtains an encrypted banking program activation code 46 from computer 30 and provides the same to player 12 for the purpose of allowing player 12 to access the credit purchasing/redemption function of banking program 26 in gaming computer 14. Player 12 then enters the amount of wagering credit requested. For security purposes, banking program 26 utilizes personal identification code 32 and software identification code 34 along with an encryption algorithm to generate a credit request code 48, which code embodies the numeric value of the amount of credit requested and is unique to player 12 and his or her gaming software 22. Credit request code 48 is displayed to player 12 on gaming computer 14, who then provides credit request code 48 to agent 38 for entry into the wagering establishment computer 30. The computer 30

applies a decryption key known only to the wagering establishment 16 to decrypt the credit request code 48 to reveal the amount of credit requested by player 12. Agent 38 orally confirms this amount with player 12. The wagering establishment 16 then decides whether or not to provide all or part of the credit requested. If the credit request is denied, player 12 is given an encrypted reactivation code 50 which is decrypted by gaming computer 14 to enable player 12 to continue wagering with any available credit balance (or player 12 has the option to cash-out any gambling winnings in accordance with the sequence depicted in FIG. 8 and described below). If the credit request is partially or fully granted, the process continues for the amount of wagering credit the wagering establishment 16 is willing to sell to player 12. The computer 30 generates an encrypted new credit code 52 which is provided to player 12 for the purposes of loading a pending amount of credit requested into the player's gaming computer 14 via the banking program 26 of the gambling software 22. Player 12 then enters new credit code 52 into gaming computer 14 which decrypts the code and reveals the exact amount of new credit being added to player 12's available credit balance. The amount of new credits are shown to player 12 as pending, but are not yet available for use. Banking program 26 then generates an encrypted credit pending code 54 which is based in part on the monetary value of the new credits pending. Player 12 provides this credit pending code 54 to agent 38 who enters the same into the wagering establishment computer 30, which then decrypts the credit pending code 54 to positively and irrefutably verify that the specific amount of credit requested was loaded into player 12's banking program 26. The wagering establishment computer 30 then generates an encrypted

credit release code 56. This credit release code 56 is provided to player 12 who then enters it into gaming computer 14. The amount of pending credits are then released for use by player 12. The banking program 26 then generates an encrypted credit release verification code 58 which player 12 provides to agent 38. Agent 38 enters the credit release verification code 58 into computer 30 which decrypts the same and generates an encrypted program reactivation code 60. Player 12 receives the program reactivation code 60 and then enters the same into gaming computer 14 and gaming program 24 is reactivated for use. Simultaneously, the wagering establishment 16 charges player 12 for the value of credits purchased in a manner mutually agreed upon by the player and the casino. For example, a credit card may be charged, a bank transfer authorized, or some other form of payment or delayed payment may be made to the casino in exchange for the credits purchased. If at any point during this process one or more of the various encrypted codes do not match those expected by the casino encryption software, the player would be unable to access such credits. The gaming software 22 in such cases is disabled until the dispute is resolved. In this manner, the correct generation of each of the various codes by gaming computer 14 and casino computer 30 serves to positively confirm the amount and value of credits received by player 12 and that such credits were released and made available for player 12's use.

It will be appreciated that credit can also be provided to the player 12 in predetermined amounts, pre-installed on a dedicated gaming computer 14 (e.g., a personal digital assistant) provided by the wagering establishment 16. Alternatively, a player 12 could obtain a disk or module 90 having a given amount of

authorized credit which is then "loaded" into the banking program gaming computer 14 to enable wagering until such time that this credit amount is exhausted. Alternatively, as shown in FIG. 1C and mentioned above can obtain credit by merely using his or her own credit card 93, either through communications with agent 38 or an electronic card-reader apparatus 91 connected to the issuing bank 95 as is well known in the art.

After player 12 has obtained wagering credit, he or she may place wagers by selecting wagering elements within various wagering events in any one of a plurality of games of chance offered by gaming software 22. Each game provides opportunities for player 12 to place wagers on one or more various wagering elements within a given wagering event depending upon the rules applicable to that game. As an example, the casino game of roulette involves a series of wagering events based upon the outcome of a random number selected by a ball spun within a roulette wheel. Each spin of the wheel is a single wagering event. Within that event, the player 12 may bet on many different wagering elements such as red and black colors, single numbers, groups of numbers and the like. All wagers for each event are placed prior to the spin of the wheel.

FIG. 7A is a flowchart depicting the wagering sequence for games of chance created by game program 24 which proceeds as follows. Player 12 first enters game program 24 of gaming software 22 and chooses a particular game on which to wager. Player 12 can wager on one or more events within the game as described above. Game program 24 prompts player 12 to confirm the placement of wagers made and the total amounts of wagers entered. Such wagers may be withdrawn or modified until such time as they are

confirmed. Confirmation is typically made by having player 12 enter a confirmation code 62 prior to closing of all bets. Confirmation code 62 is provided by game program 24 and can be made different for every wager for security reasons. It can be a simple one or two digit alphanumeric code which is entered into game software 24 to confirm that each bet placed for any wagering event is what was intended and has not been placed in error. Game program 24 can be set up such that confirmation code 62 may be simplified further to a single key stroke in certain highly repetitive games such as slots or when the total value of all wagers falls below a certain predetermined level. After confirmation code 62 is entered by player 12, game program 24, in accordance with the rules of a given casino game, generates a specific outcome for a given wagerable event (e.g., cards are dealt, the wheel is spun, etc.). Game program 24 determines the outcome of each wager placed (win, lose or draw), calculates and then displays player 12's proposed correct payoff for that wager on gaming computer 14. Player 12 has the option to type in a yes/no code to accept the payoff outcome of all wagers or to dispute any payoff which player 12 believes is incorrect in some fashion. Any dispute can be handled by suspending the wagering process and calling agent 38 to resolve the matter by telephone or by some other means of dispute resolution. Once player 12 accepts the resolution of a given wagering event, the correct amount of credit is added or subtracted from player 12's wagering credit balance by banking program 26 of gaming software 22. Player 12 can then begin the wagering process all over again on a subsequent wagering event, or choose to end the gambling session. At any time, player 12 may select a review mode in game program 24 and review the amount and resolution of each and every

wager made by player 12 and the results of such wagers in chronological order. At any time, player 12 can choose to redeem or cash-out all or part of the balance of wagering credits stored in banking program 26 through a credit cash-out sequence. Game program 24 can also contain special built-in instructions to place limitations on winnings at the discretion of the wagering establishment. It is also anticipated that such gaming software 22 could be embedded in another product, such as in a computer or other software, to provide a premium application which enables the purchaser of unrelated products to win something as governed by such an embedded program (e.g., a cash prize awarded).

FIGS. 7B-7C are flowcharts of wagering sequences for future public events of which the outcome is uncertain, such as a lottery, in the off-line embodiment. With regard to the description of lotteries herein, the wagering establishment will be hereinafter identified as a "lottery authority". The player 12 selects, by means of the gaming software 22, a particular lottery event (i.e., a drawing) on which to wager. The gaming computer 14 then generates a lottery "ticket" layout unique to the specific lottery and the player selects the desired wagering elements (i.e., numbers).

There are two types of exemplary lotteries described herein, the first being an instant type analogous to common scratch-off tickets, and the second being a future event of which the outcome is uncertain (i.e., a drawing takes place). In the case of instant lotteries, verification of the date/time of the wager is not important by definition since the essentially instantaneous output of the program determines the outcome. On the other hand, with future events, the date and time of the wager is

critical in certain embodiments. It will be appreciated by the persons skilled in the art that a remote gaming arrangement whereby the player 12 participates in a lottery can be classified as either: (1) a non-registration system (by which the player wagers independently of the lottery authority 16 and the wager need not be registered with the lottery authority since the gaming computer 14 provides a means of time-stamping the wager) or (2) a registration system (by which the player 12 chooses the wagering elements on the remote gaming computer 14, but then must contact the lottery authority 16 to "register" the wager).

In a non-registration embodiment such as depicted in FIG. 7B, a wager is placed in the following manner: Player 12 logs on to the lottery application in the gaming computer 14 with his or her personal identification code 204, which is preassigned by the lottery authority 16 with whom the player 12 has preregistered. In this regard, an encryption/decryption device 82, depicted in FIG. 2 and described in more detail below, can be used to prevent minors from accessing the lottery program. Such device could utilize fingerprint or voice recognition hardware for additional verification. Player 12 then selects a specific lottery to play (e.g., Lotto). Player 12 then chooses the desired wagering elements 206 in a conventional manner, which choice may be confirmed upon the player receiving a suitable prompt. The gaming computer 14 then generates an encrypted, compressed multi-digit ticket code 208 representing the selected wagering elements 206, and an unforgeable date/time stamp 210. Optionally, such ticket code 208 may include a personal identification code 204 or software identification code 212. The ticket code 208 is

stored in the gaming computer 14 and can be decrypted only by the lottery authority 16 for authentication. If desired, a physical "ticket" representing the player's choice in the encrypted ticket code could be printed by conventional printing means associated with the gaming computer 14. This procedure may be repeated as many times as necessary to participate in multiple lottery events or to chose wagering elements for a single event. Such an arrangement allows wagering to take place independent from the lottery authority 16. The unforgeable date/time stamp ensures that the player 12 cannot tamper with the wager "after the fact" (i.e., after the drawing, the player cannot modify the numbers selected). To cash-out, the player 12 provides the encrypted ticket code 208 to the lottery authority 16 which decrypts the ticket code to reveal the selected wagering elements and date/time of the wager. Winnings are then awarded in a conventional manner. It is anticipated that large winnings will require that the Player 12 return the physical device to the lottery authority 16 for verification.

FIG. 7C depicts a registration sequence whereby the player 12 registers his or her lottery choice(s) with the lottery authority 16. When player 12 is ready to do so, the lottery authority 16 is contacted through agent 38. The player 12 then enters his or her pin 204, either by pressing corresponding keys of the telephone, or on the gaming computer 14 (if these are placed on-line in either a temporary or permanent connection), or by speaking the selections through the telephone for acquisition by a voice recognition program of the type known in the art. For additional verification, player 12 can be asked to enter the computer or software identification code 212. The lottery authority 16 will request that the

player 12 choose from a menu of lotteries which are still open for wagering, and the player then makes the desired selection(s). The player 12 then indicates the method of payment. In certain applications, credit can be pre-installed on the gaming computer 14 or module 90, as described above, in which case such credit can be included and represented in an encrypted ticket code 208. Normally, ticket-code 208 need not be encrypted in a registration embodiment (i.e., it merely represents the choice of wagering elements). If the ticket code is encrypted, it is then decrypted with a key known only to the lottery authority 16. This ensures and verifies that a valid lottery selection and sufficient credit were entered. The lottery authority 16 may confirm the transaction by reading back the wagering elements embodied in the code. After the lottery authority 16 accepts the ticket code 208, it generates a registration code 218 (encrypted or non-encrypted) which embodies the ticket code 208 and a current date/time stamp 220. The registration code 218 can be provided to the player 12 and is stored by the lottery authority 16 in the lottery authority computer 30 for future reference. The lottery authority 16 can then prompt the player to confirm the wager by entering a simple yes/no response. If desired, the lottery authority 16 can impose a limit on the number of wagers per player or per given time period and reject wagers exceeding set amounts. Optionally, the player 12 may obtain printed ticket receipts which include the registration code 218 from the gaming computer 14. The wagering process may be repeated for each "ticket" registered. When he or she is finished, the player 12 simply hangs up or terminates the connection with the lottery authority 16. After the lottery drawing or process, the lottery authority 16 compares any winning numbers against all

registered tickets in accordance with conventional practice. If the prize is below a specific threshold (e.g., $100), then such prize can be credited to the player's account or credit card, or, if above a certain threshold, payouts can be made in a conventional manner.

In general, there are several ways by which the player 12 can cash-out winnings when such winnings are embodied or stored in the gaming computer 14.

FIG. 8A is a flowchart diagram of the credit cash-out sequence in a first off-line embodiment. Player 12 first goes through the handshake sequence depicted in FIG. 5 and described above. Once player 12's identity is confirmed, the wagering establishment 16 provides player 12 with an encrypted banking activation code 64. Player 12 then activates banking program 26 and enters banking activation code 64 which is decrypted by gaming computer 14 to access the banking purchasing/redemption function. Player 12 then enters the amount of wagering credit he or she wants to cash-out into banking program 26. The amount to be cashed out is placed by banking program 26 into a cash out pending field. The player's banking program 26 then generates an encrypted credit cash-out code 66 which player 12 provides to wagering establishment 16. The agent 38 enters the credit cash-out code 66 into the wagering establishment computer 30 which decrypts the credit cash-out code 66 to reveal the amount of credit that player 12 is requesting to be cashed out, which amount is orally confirmed by casino agent 38. The wagering establishment computer 30 then generates an encrypted cash-out acknowledgment code 68 and provides this code to the player 12. Player 12 enters a cash-out acknowledgment code 68 into gaming computer 14 which decrypts the same, and banking program 26 then deducts the amount of credits to be

cashed out of the player's credit balance available for future wagers. Banking program 26 then generates an encrypted deduction verification code 70 which indicates that the correct amount was deducted from the player's account. This code is then provided to agent 38 who enters it into computer 30. The wagering establishment computer 30 decrypts deduction verification code 70 and generates an encrypted program reactivation code 72 which is provided to player 12 to enable game program 24 to permit continued gambling with any available credits. The wagering establishment 16 then issues payment to player 12 for the amount of all wagering credit cashed out. The payment may be in the form of a credit to the player's credit card, a banking wire or some other mutually agreed-upon method of payment. It is also contemplated that where the player 12 has been provided with a dedicated gaming computer 14 (e.g., a hand-held device) credit may be cashed-out by simply bringing such gaming computer 14 to the wagering establishment 16 or its agent, where either the entire device itself is physically returned or a plug-in credit module 90 (tamper-proof, as described above) is exchanged.

FIGS. 9-12 contain flowcharts of an on-line embodiment schematically depicted in FIG. 2, whereby gaming computer 14 communicates directly through a communications link 29, such as a modem, with the wagering establishment computer 30. Computer 30 includes gaming software 74 comprised of a game program 76, banking program 77, audit program 78 and encryption/decryption algorithm 79. To prevent unauthorized access, an encryption/decryption device 82, such as that shown schematically in FIG. 2, is used by player 12 to generate a unique alphanumeric identification code 83 to log-on to computer 30 in

order to obtain access to on-line gambling and/or purchasing and redeeming wagering credit. In one embodiment, device 82 looks like a credit-card calculator and includes a display 84, an integral keyboard 86 and internal encryption/decryption hardware and/or software. Such a device is currently used for making wireless money transfers, for example by Fleet Bank. Codes input and output to and from device 82 could be embodied in specific sounds identified through a dedicated sound recognition program which are transmitted to and received from computer 30. The encryption/decryption device 82 is used to generate encrypted log-on code 83 by encrypting player 12's personal identification code 32 with a separate verification code 88 provided to player 12 by computer 30. Alternatively, verification code 88 can be built into encryption/decryption device 82. Thus, knowledge of player 12's personal identification code 32 in and of itself is insufficient to enable an unauthorized third party such as a minor or known compulsive gambler to obtain access to gambling and/or purchasing and redeeming wagering credit. The computer 30 could contain appropriate instructions to, in such a case, terminate the on-line connection and prevent further attempts to gain access with that particular personal identification code 32. Moreover, the device 82 can have the banking program 26 associated therewith in order to store wagering credit independent of the gaming computer 14, in which case the exchange of codes between the device 82 and the gaming computer 14 would represent the actual "money". Thus, credit can be embodied in an apparatus structurally independent of the gaming computer.

FIG. 9 is a flowchart of the registration and start-up sequence. Initially, player 12 through

gaming computer 14, dials up and connects through communications link 29 with computer 30. Player 12 then enters the requested registration information and is assigned a personal identification code 32. Player 12 then logs-on as described above. If player 12's identity is confirmed, computer 30 then permits wagering and/or credit purchase and redemption.

As shown in FIG. 10, the purchase credit sequence in the on-line embodiment is comprised of the following series of exchanges between player 12 and computer 30. Computer 30 first queries the player as to how much credit is desired for the particular gambling session. Player 12 responds at the prompt with the amount of wagering credit requested. The wagering establishment 16 then gets authorization for the requested amount through agreed upon methods of credit such as a credit card or the like. The approved credit amount is then deposited into player 12's wagering credit account in banking program 77. At such stage, player 12 can then wager on a plurality of games offered by the wagering establishment 16. In this connection, player 12 may at the end of each session, request an encrypted code number that verifies the amount of credit he or she has available from the wagering establishment 16 at that time for purposes of any future dispute resolution.

FIG. 11 is a flowchart of the gambling sequence in the on-line embodiment. Player 12 first activates gaming computer 14, establishes electronic communications with the wagering establishment computer 30 through communications link 29, and proceeds with the secure log-on procedure described above. Gaming computer 14 then registers a gambling session code 80 with the wagering establishment 16. The computer 30 then displays a choice of games of chance or future public events where the outcome is

uncertain to be wagered upon.

FIG. 12 is a flowchart of the credit cash-out sequence in the on-line embodiment. Player 12 first requests to cash-out all or part of the credit balance in the wagering credit account maintained on casino computer 30. The wagering establishment 16 requests confirmation for the amount of credit to be cashed-out by player 12. Player 12 then keys in his or her personal identification code 32 to reconfirm that amount. The amount is then deducted from player 12's credit account and the wagering establishment 16 then authorizes a credit to be made to the player's preassigned credit card, or makes some other agreed-upon method of payment. For additional verification, the encryption/decryption device 82 can be used to provide a verification code to the wagering establishment 16 prior to cashing-out. Moreover, the wagering establishment 16 can be provided with a special telephone number to call-back player 12 to confirm the cash-out which can only then occur when player 12 calls the wagering establishment 16 back from that number, to provide an additional measure of security.

Alternatively, in another on-line embodiment, the gaming computer 14 includes gaming software 22 as in the first embodiment of FIG. 1, but the wagering establishment computer 30, through communications line 29 may or may not serve to regulate or control the gaming software simulation of casino games on gaming computer 14. For example, the wagering establishment computer 30 can directly keep a record of all or selected activates taking place at gaming computer 14 for purposes of additional verification or security. Alternatively, the electronic link can be of a control nature to vary the odds of a given wager based upon any of a variety of factors such as gambling duration

or other factors such as a progressively increasing jackpot (e.g., in a slot machine simulation).

In the off-line embodiment, at all times, an encrypted audit-trail of all transactions can be recorded on storage media associated with the wagering establishment computer 30, and independently in gaming computer 14 to be ultimately downloaded to or accessed by the wagering establishment 16. Such an audit-trail can also be recorded in the tamper-proof read/write data storage media device 28 provided by the wagering establishment 16 to player 12 the wagering establishment in the embodiment shown in FIG. 3.

The present invention has been shown and described in what are considered to be the most practical and preferred embodiments. It is anticipated, however, that departures may be made therefrom and that obvious modifications will occur to persons skilled in the art.

WHAT IS CLAIMED IS:

1. A gaming system, comprising:

a host computer which enables a player at a remote location to purchase and redeem gambling credit and which generates at least one encrypted code to be provided from said host computer and which decrypts at least one encrypted code to be provided to said host computer;

an off-line gaming computer remotely disposed from said host computer on which the player wagers on at least one wagering opportunity, said gaming computer for generating at least one wagering opportunity and enabling the purchasing, storing and redeeming of gambling credit, said gaming computer further generating said at least one encrypted code to be provided to said host computer and decrypting said at least one encrypted code to be provided from said host computer, wherein said encrypted codes exchanged between said host computer and said gaming computer enable the player to at least one of purchase and redeem gambling credit.

2. The gaming system recited in Claim 1, wherein said gaming computer includes gaming software for generating said at least one wagering opportunity and enabling said purchasing, storing and redeeming of gambling credit, provided on data storage media.

3. The gaming system recited in Claim 1, wherein said gaming computer communicates with data memory media disposed within a tamper-proof read/write apparatus.

4. The gaming system recited in Claim 2, wherein said gaming computer reads the unique magnetic characteristics of said data storage media for the purposes of creating a unique encrypted code to thereby prevent undetectable duplication of data stored on said data storage media.

5. The gaming system recited in Claim 1, wherein said gaming computer records and stores said codes provided to and from said gaming computer to generate an audit-trail.

6. The remote gaming system recited in Claim 1, wherein said host computer records and stores said codes provided to and from said host computer to generate an audit-trail.

7. The remote gaming system recited in Claim 1, wherein said gaming computer is provided with a predetermined amount of casino credit embodied in at least one of data storage media permanently installed on said gaming computer and data storage media removably installed on said gaming computer.

8. The remote gaming system recited in Claim 1, wherein said gaming computer includes at least one of voice recognition means for identifying the unique voice characteristics of the player and fingerprint identification means for identifying the unique fingerprint of the player.

9. The remote gaming system recited in Claim 1, wherein said wagering opportunity is a game of skill.

10. A gaming system, comprising:

a host computer which enables a player networked at a remote location to purchase and redeem gambling credit and wager on at least one wagering opportunity, said host computer generating at least one code to be communicated from said host computer and decrypting at least one encrypted code communicated to said host computer;

a gaming computer on which the player wagers on said at least one wagering opportunity where said gaming computer is remotely disposed from said host computer; and

means for generating at least one

encrypted code for communication to and decryption by said host computer to enable the player to access said host computer from said gaming computer.

11. The remote gaming system recited in Claim 10, wherein said means for generating said at least one encrypted code is embodied in an apparatus which is structurally independent of said gaming computer.

12. A gaming computer for use in a gaming system for wagering against a wagering establishment;

wherein said gaming computer generates and provides at least one wagering opportunity and enables a player at a remote location to wager on said at least one wagering opportunity and to purchase and redeem gambling credit from said wagering establishment.

13. The gaming computer recited in Claim 12, wherein a predetermined amount of said credit is pre-installed in said gaming computer by said wagering establishment.

14. The gaming computer recited in Claim 12, wherein said credit is redeemed from said wagering establishment by providing said wagering establishment with said gaming computer.

15. The gaming computer recited in Claim 12, wherein said credit is stored on detachable data memory media which interface with said gaming computer and where said data memory media are provided to said wagering establishment for credit redemption.

16. A gaming method by which a player gambles on a gaming computer against a wagering establishment where no on-line connection exists between the gaming computer and the wagering establishment, comprising the steps of:

(A) purchasing gambling credit from said wagering establishment and at least one of loading and preloading said gambling credit into said gaming

computer;

(B) generating at least one wagering opportunity on said gaming computer;

(C) proceeding to wager on said at least one wagering opportunity presented on said gaming computer;

(D) accumulating wagering credits or debits on said gaming computer as a result of the outcome of said at least one wagering opportunity; and

(E) redeeming gambling credit from said wagering establishment by entering codes provided from said wagering establishment, at least one of which is encrypted, into said gaming computer which decrypts said at least one encrypted code and generates codes provided to said wagering establishment, at least one of which is encrypted, for decryption by said wagering establishment.

17. A gaming method by which a player having a personal identification code gambles against a wagering establishment on a gaming computer which presents a computer generated wagering opportunity where the gaming computer is at a remote location and networked to a host computer associated with the gaming establishment, comprising the steps of:

(A) establishing a secure on-line link between said gaming computer and said host computer by generating an encrypted log-on code embodying an identification code known only to the player and the wagering establishment and a separate code, said host computer then decrypting said encrypted log-on code for verification;

(B) purchasing gambling credit from said wagering establishment;

(C) generating at least one wagering opportunity on said gaming computer;

(D) proceeding to wager on said at least

one wagering opportunity presented on said gaming computer; (E) accumulating wagering credits or debits as a result of the outcome of said at least one wagering opportunity; and

(F) redeeming gambling credit from said wagering establishment.

18. The method recited in Claim 17, wherein Step (F) further comprises generating an encrypted verification code embodying an identification code known only to the player and the wagering establishment and a separate code, to be decrypted by said host computer for verification prior to redeeming said gambling credit.

19. The method recited in Claim 17, wherein said encrypted log-on code is generated by an encryption/ decryption apparatus which is structurally independent of said gaming computer.

20. The method recited in Claim 17, wherein said gambling credit is embodied in an encryption/decryption apparatus which is structurally independent of said gaming computer.

21. A gaming system which enables a player at a remote location to wager against a wagering establishment, wherein the player wagers on a gaming computer where said gaming computer generates at least one wagering opportunity and enables the player to at least one of purchase gambling credit and redeem gambling winnings.

22. The gaming system recited in Claim 21, wherein said purchased pre-installed credit is embodied in a tamper-proof plug-in module, provided by the wagering establishment and interfaced with said gaming computer.

23. The gaming system recited in Claim 21, wherein said gambling winnings are electronically stored on a tamper-proof plug-in module provided by

the wagering establishment and interfaced with said gaming computer.

24. The gaming system recited in Claim 21, wherein said gaming computer includes gaming software for generating said at least one wagering opportunity, and said gaming software resides on a tamper-proof chip disposed in an inspectable casing.

25. The gaming system recited in Claim 21, wherein said gaming computer includes gaming software for generating said at least one wagering opportunity which includes a random distribution of codes known only to the wagering establishment to prevent unauthorized tampering with said gaming software.

26. The gaming system recited in Claim 21, wherein said gaming computer includes gaming software for generating said at least one wagering opportunity, and means for receiving external keys input to said gaming software, said keys being used by said gaming software to function and which disable said gaming program if said gaming software has been tampered with.

27. The gaming system recited in Claim 21, wherein said gaming computer includes gaming software for generating said at least one wagering opportunity upon receiving data from a source external to said gaming computer.

28. A gaming system which enables a player at a remote location to participate in a lottery by choosing a selection of wagering elements in a lottery on a gaming computer.

29. The gaming system recited in Claim 28, wherein said selection is combined, with at least one of a date/time stamp, player's identification code, and computer/software identification code, into a compressed ticket-code to be decrypted by a lottery authority for registration.

30. The gaming system recited in Claim 28,

wherein said selection is date/time stamped to form an encrypted ticket code for decryption by a lottery authority to reveal a valid wager.

31. A method by which a player participates in a lottery offered by a lottery authority, comprising the steps of:

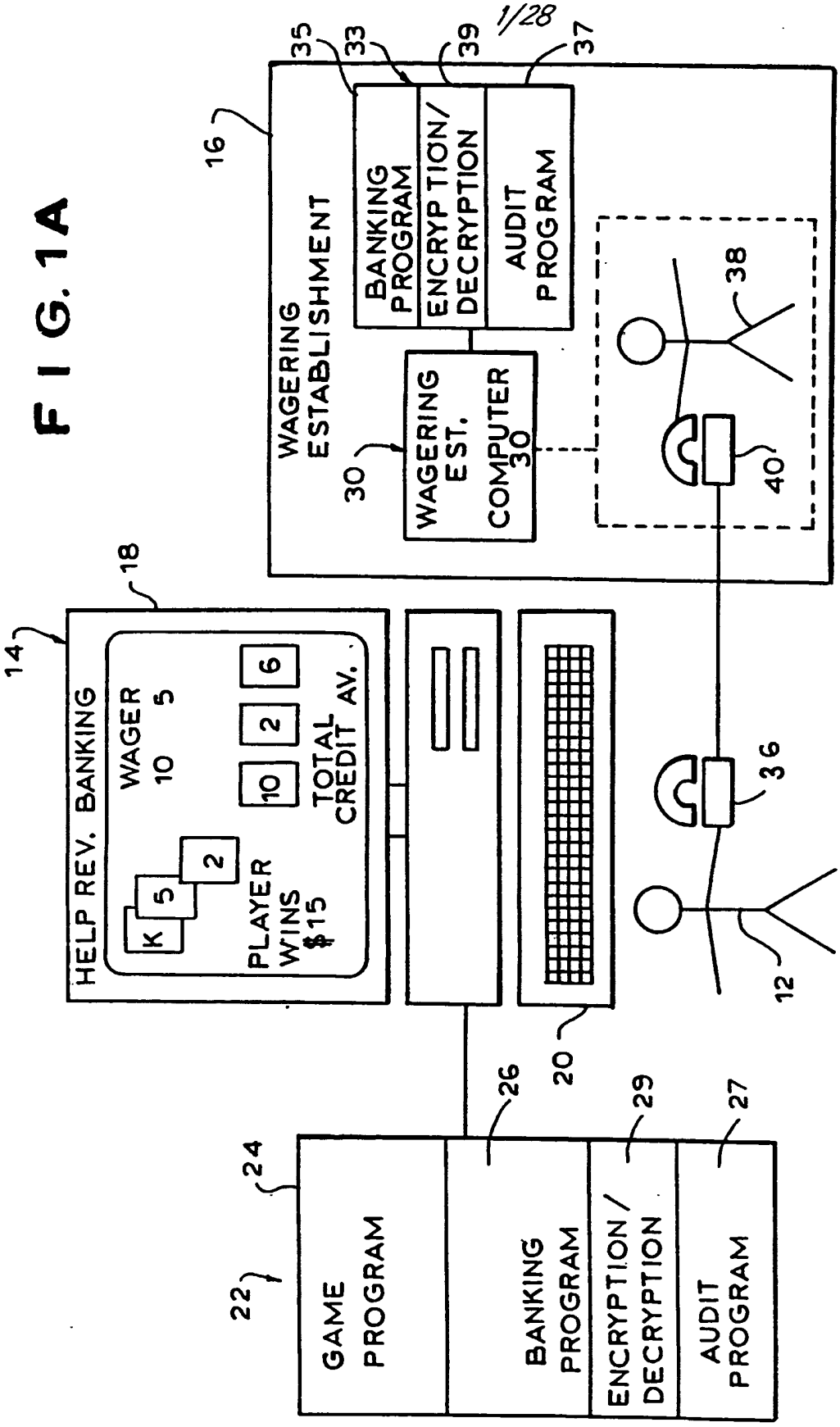
(A) choosing wagering elements for a given lottery event on a gaming computer;

(B) generating a ticket code on said gaming computer which embodies the choice of said wagering elements and at least one of a time/date stamp, player's identification code, computer identification code, and software identification code;

(C) registering the wager with the lottery authority by communicating said ticket code to the lottery authority, where said lottery authority has a host computer which decrypts said ticket code to reveal the player's choice of wagering elements;

(D) confirming the wager by generating an encrypted registration code on said host computer by encrypting said ticket code with a time/date stamp using an encryption algorithm known only to the lottery authority.

FIG. 1A


WAGERING ESTABLISHMENT
16
BANKING PROGRAM
ENCRYPTION/ DECRYPTION
AUDIT PROGRAM
35
33
39
37
WAGERING EST. COMPUTER 30
30
38
40
36
12
HELP REV. BANKING
WAGER 10 5
PLAYER WINS $15
TOTAL CREDIT AV.
14
18
20
22
24
GAME PROGRAM
BANKING PROGRAM
ENCRYPTION/ DECRYPTION
AUDIT PROGRAM
26
29
27

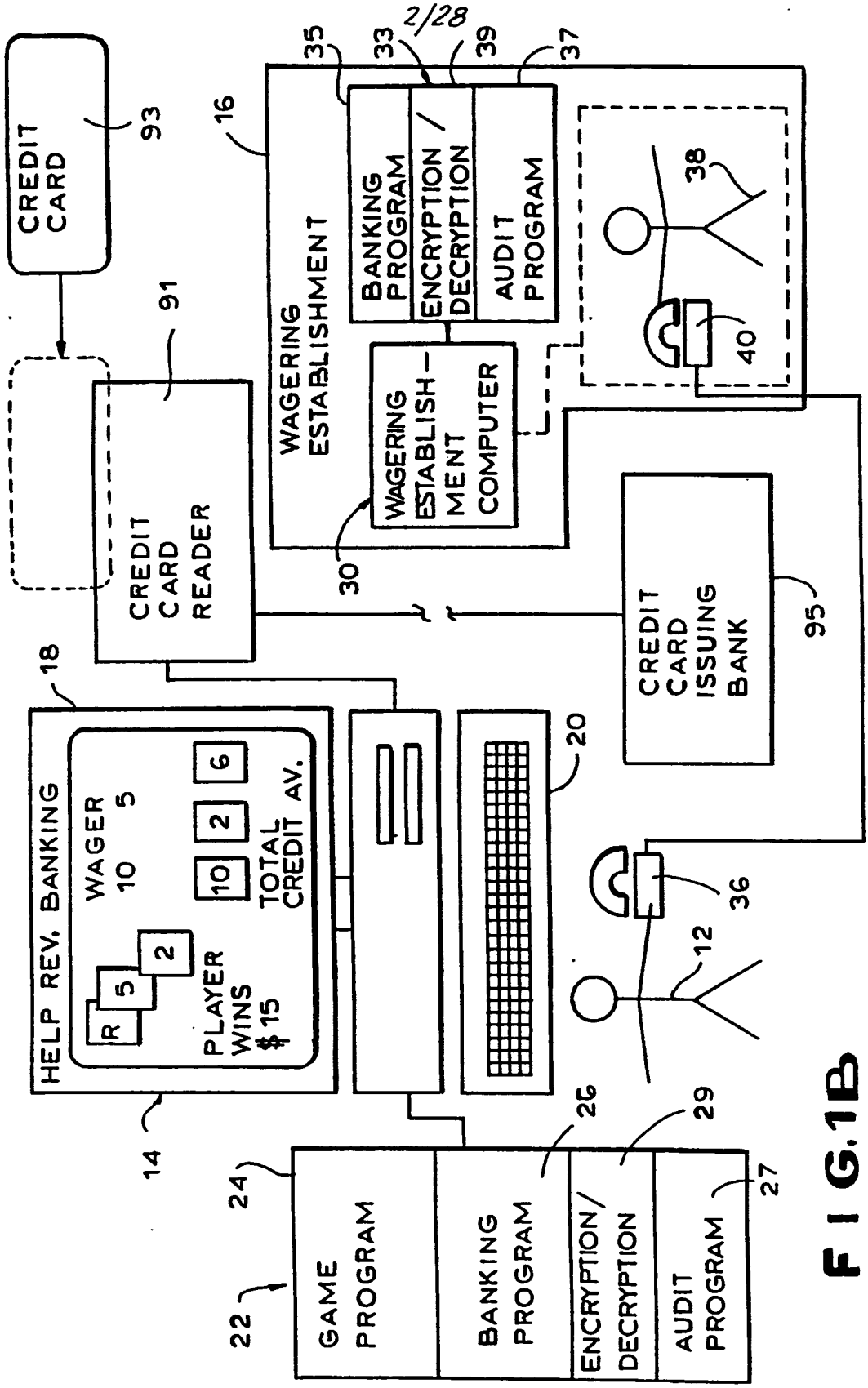

2/28
CREDIT CARD
93
91
CREDIT CARD READER
16
WAGERING ESTABLISHMENT
35
33
39
37
BANKING PROGRAM
ENCRYPTION / DECRYPTION
AUDIT PROGRAM
38
40
WAGERING ESTABLISHMENT COMPUTER
30
CREDIT CARD ISSUING BANK
95
18
HELP REV. BANKING
WAGER 10 5
TOTAL CREDIT AV.
10
2
6
R
5
2
PLAYER WINS $15
20
36
12
14
24
22
GAME PROGRAM
BANKING PROGRAM
26
ENCRYPTION / DECRYPTION
29
AUDIT PROGRAM
27

FIG.1B

FIG. 1C

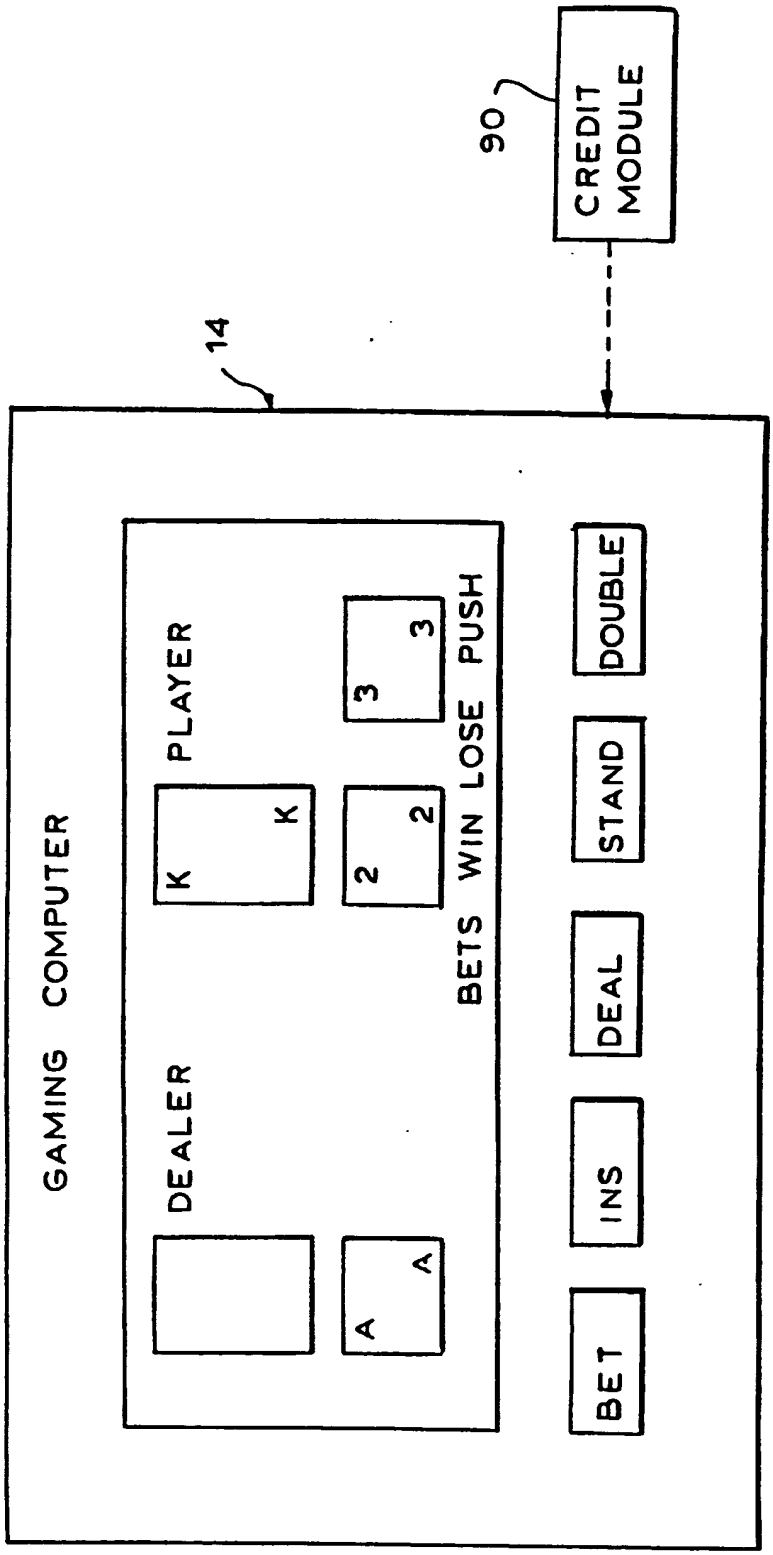
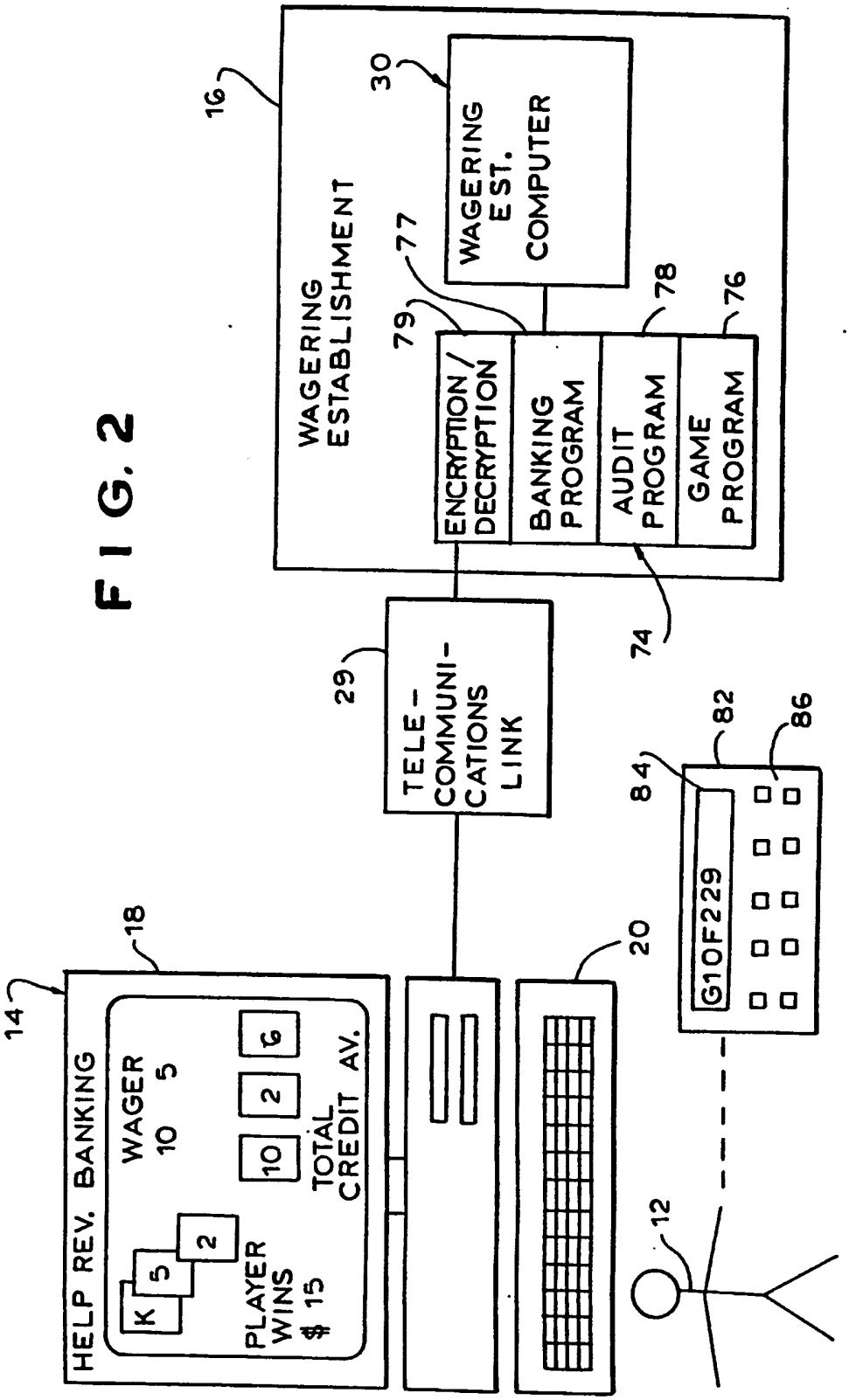

90
CREDIT MODULE
14
GAMING COMPUTER
DEALER
PLAYER
K
K
2
2
3
3
A
A
BETS WIN LOSE PUSH
BET
INS
DEAL
STAND
DOUBLE

FIG. 2


16
WAGERING ESTABLISHMENT
30
WAGERING EST. COMPUTER
77
79
78
76
ENCRYPTION / DECRYPTION
BANKING PROGRAM
AUDIT PROGRAM
GAME PROGRAM
74
29
TELE-COMMUNI-CATIONS LINK
82
86
84
G10F229
14
18
HELP REV. BANKING
WAGER
10 5
TOTAL CREDIT AV.
10 2 6
PLAYER WINS $ 15
K 5 2
20
12

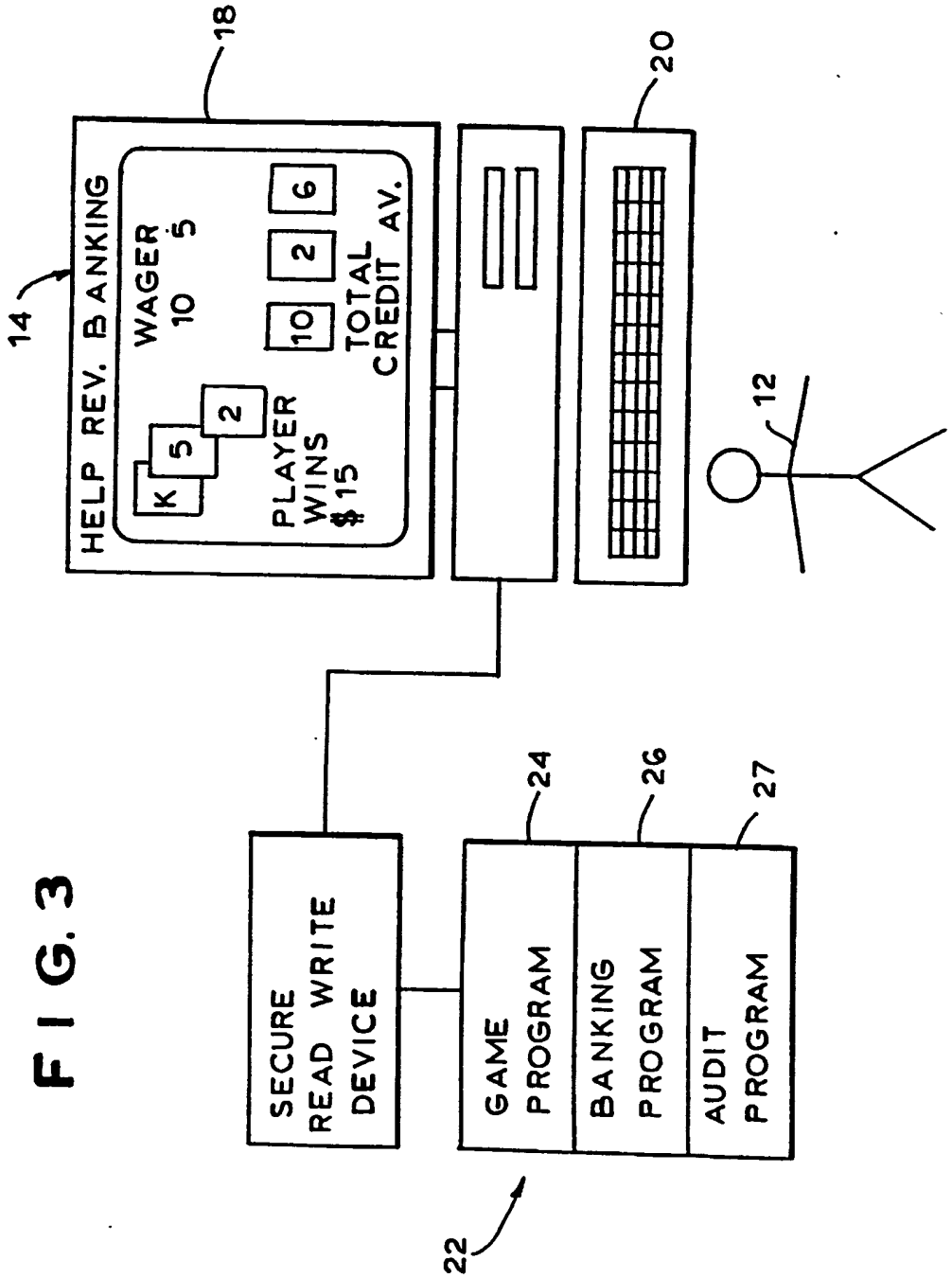

18
20
14
HELP REV. BANKING
WAGER
10
5
TOTAL
CREDIT AV.
10
2
6
PLAYER
WINS
$15
K
5
2
12
SECURE
READ WRITE
DEVICE
24
26
27
GAME
PROGRAM
BANKING
PROGRAM
AUDIT
PROGRAM
22

FIG. 3

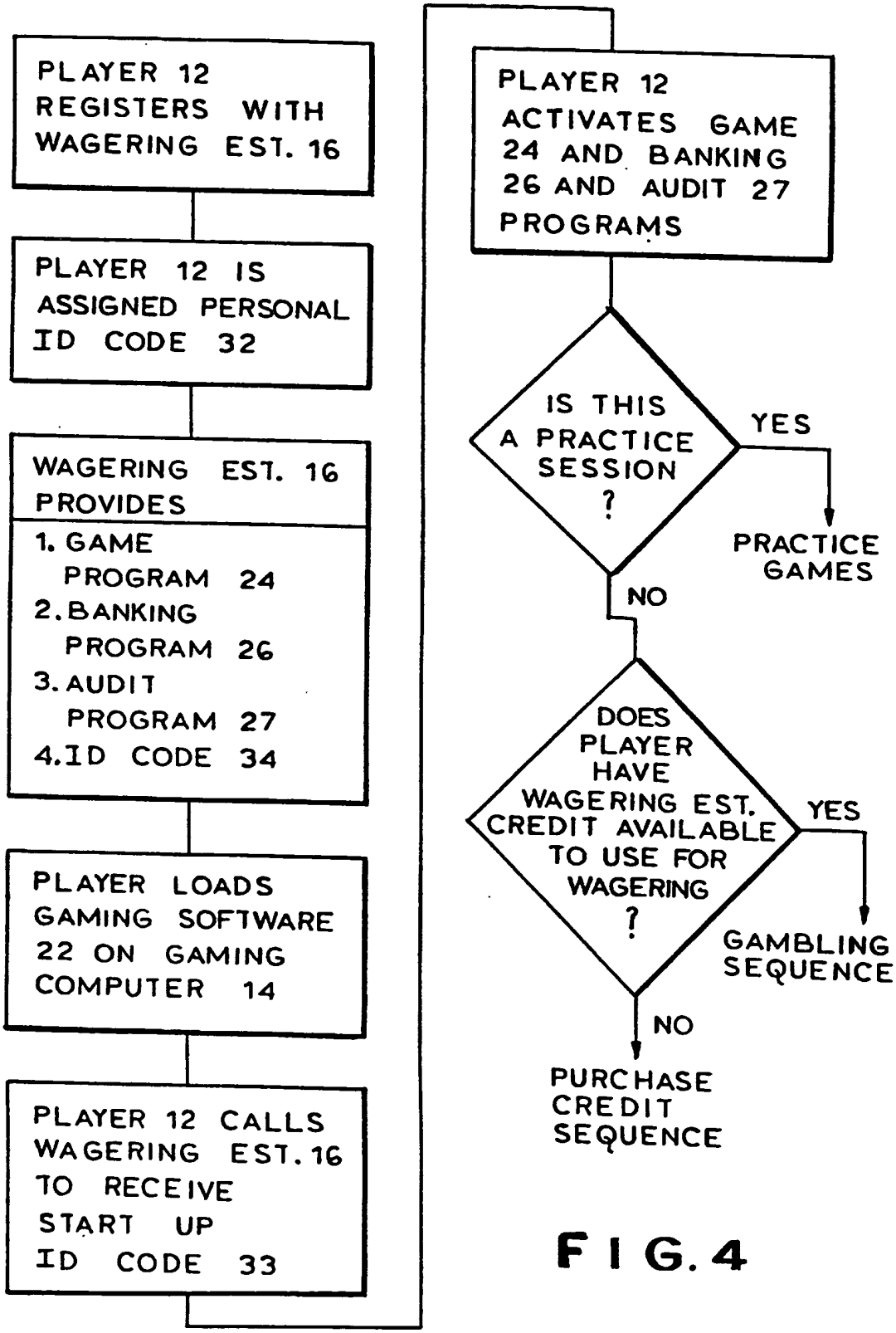

PLAYER 12 REGISTERS WITH WAGERING EST. 16
PLAYER 12 IS ASSIGNED PERSONAL ID CODE 32
WAGERING EST. 16 PROVIDES
1. GAME PROGRAM 24
2. BANKING PROGRAM 26
3. AUDIT PROGRAM 27
4. ID CODE 34
PLAYER LOADS GAMING SOFTWARE 22 ON GAMING COMPUTER 14
PLAYER 12 CALLS WAGERING EST. 16 TO RECEIVE START UP ID CODE 33
PLAYER 12 ACTIVATES GAME 24 AND BANKING 26 AND AUDIT 27 PROGRAMS
IS THIS A PRACTICE SESSION ?
YES
PRACTICE GAMES
NO
DOES PLAYER HAVE WAGERING EST. CREDIT AVAILABLE TO USE FOR WAGERING ?
YES
GAMBLING SEQUENCE
NO
PURCHASE CREDIT SEQUENCE

FIG. 4

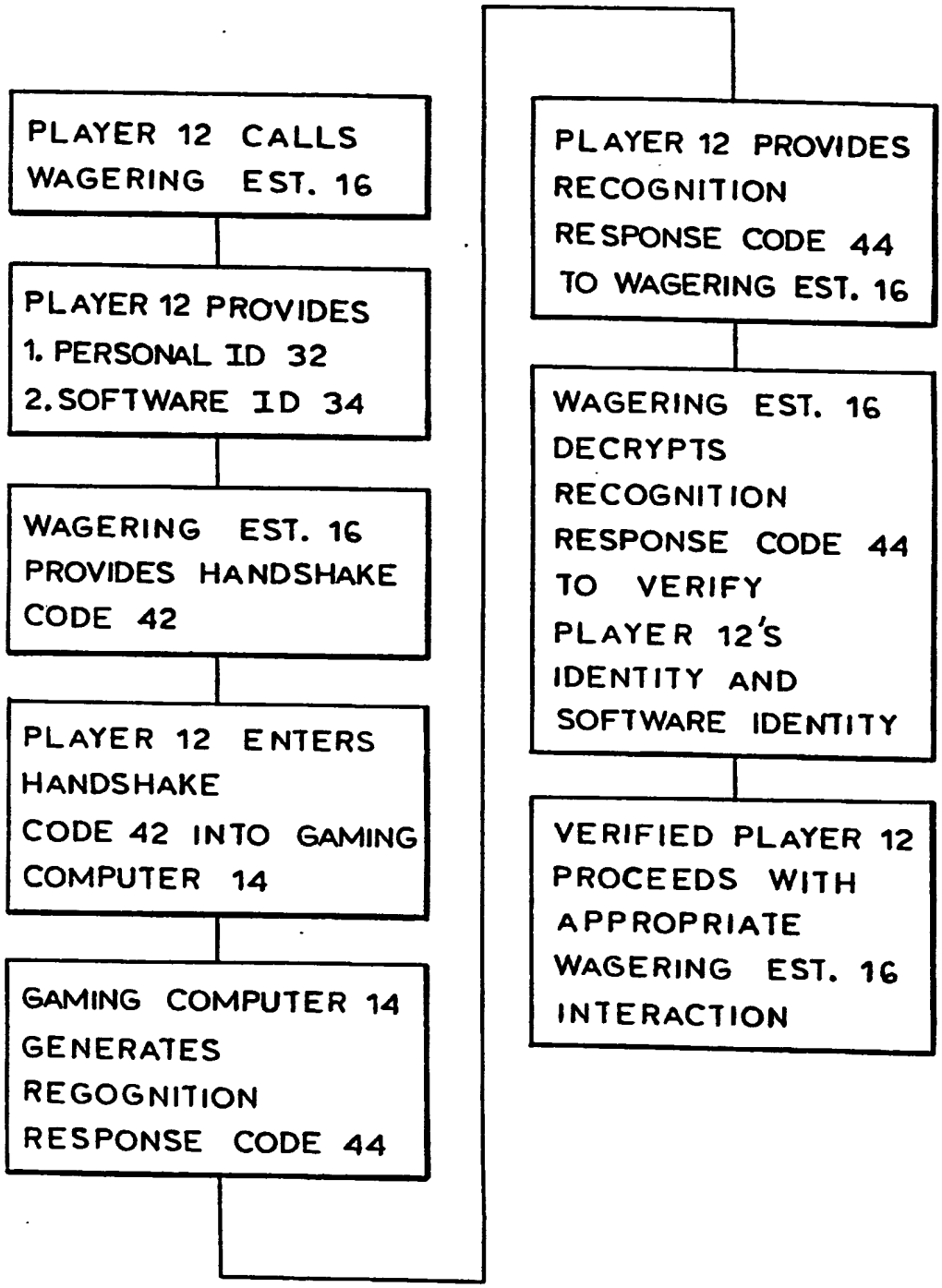
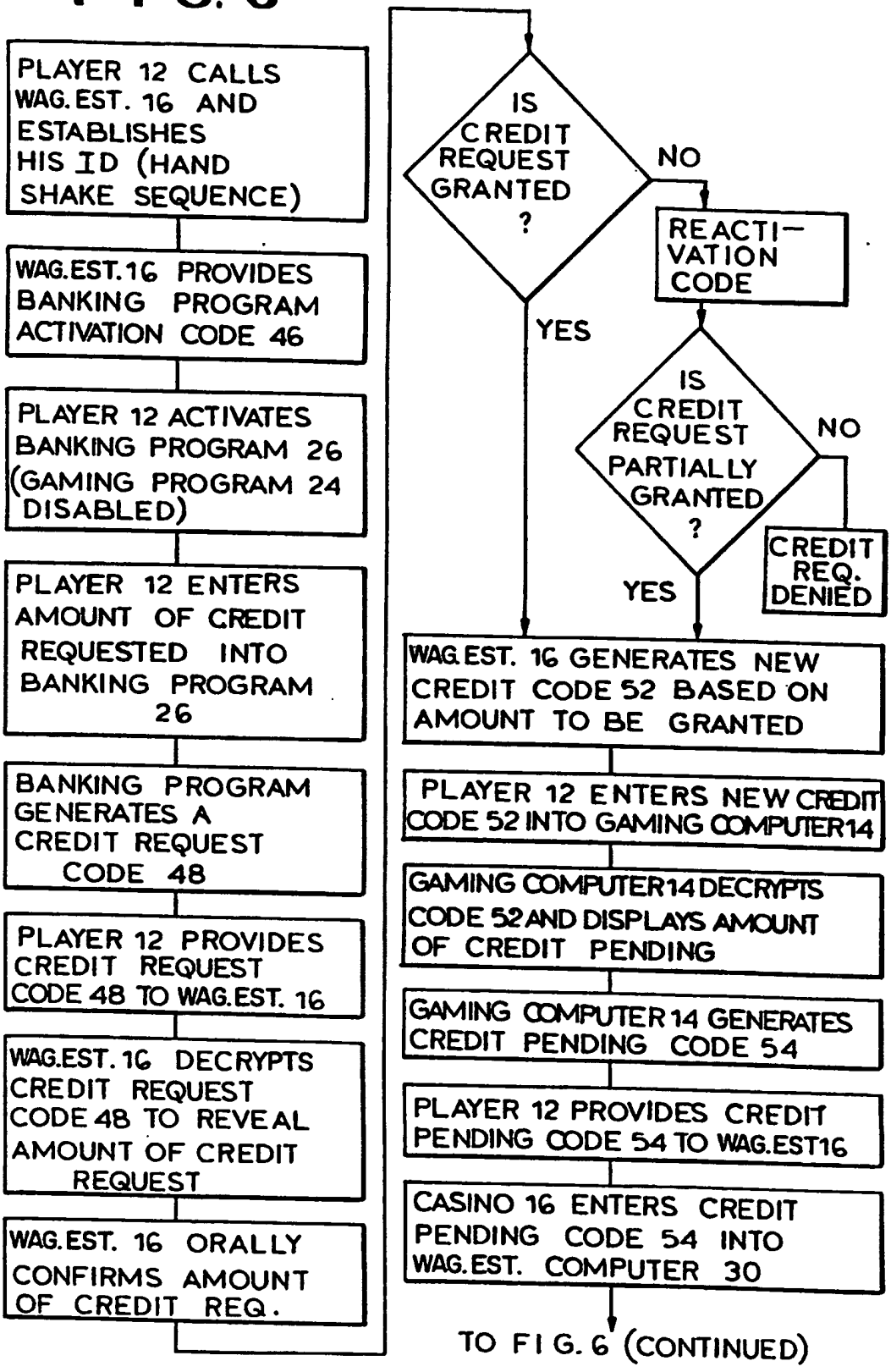

PLAYER 12 CALLS WAGERING EST. 16
PLAYER 12 PROVIDES 1. PERSONAL ID 32 2. SOFTWARE ID 34
WAGERING EST. 16 PROVIDES HANDSHAKE CODE 42
PLAYER 12 ENTERS HANDSHAKE CODE 42 INTO GAMING COMPUTER 14
GAMING COMPUTER 14 GENERATES REGOGNITION RESPONSE CODE 44
PLAYER 12 PROVIDES RECOGNITION RESPONSE CODE 44 TO WAGERING EST. 16
WAGERING EST. 16 DECRYPTS RECOGNITION RESPONSE CODE 44 TO VERIFY PLAYER 12'S IDENTITY AND SOFTWARE IDENTITY
VERIFIED PLAYER 12 PROCEEDS WITH APPROPRIATE WAGERING EST. 16 INTERACTION

FIG. 5

FIG. 6


PLAYER 12 CALLS WAG. EST. 16 AND ESTABLISHES HIS ID (HAND SHAKE SEQUENCE)
WAG.EST.16 PROVIDES BANKING PROGRAM ACTIVATION CODE 46
PLAYER 12 ACTIVATES BANKING PROGRAM 26 (GAMING PROGRAM 24 DISABLED)
PLAYER 12 ENTERS AMOUNT OF CREDIT REQUESTED INTO BANKING PROGRAM 26
BANKING PROGRAM GENERATES A CREDIT REQUEST CODE 48
PLAYER 12 PROVIDES CREDIT REQUEST CODE 48 TO WAG.EST. 16
WAG.EST. 16 DECRYPTS CREDIT REQUEST CODE 48 TO REVEAL AMOUNT OF CREDIT REQUEST
WAG.EST. 16 ORALLY CONFIRMS AMOUNT OF CREDIT REQ.
IS CREDIT REQUEST GRANTED ?
NO
REACTI-VATION CODE
YES
IS CREDIT REQUEST PARTIALLY GRANTED ?
NO
CREDIT REQ. DENIED
YES
WAG.EST. 16 GENERATES NEW CREDIT CODE 52 BASED ON AMOUNT TO BE GRANTED
PLAYER 12 ENTERS NEW CREDIT CODE 52 INTO GAMING COMPUTER 14
GAMING COMPUTER 14 DECRYPTS CODE 52 AND DISPLAYS AMOUNT OF CREDIT PENDING
GAMING COMPUTER 14 GENERATES CREDIT PENDING CODE 54
PLAYER 12 PROVIDES CREDIT PENDING CODE 54 TO WAG.EST 16
CASINO 16 ENTERS CREDIT PENDING CODE 54 INTO WAG.EST. COMPUTER 30
TO FIG. 6 (CONTINUED)

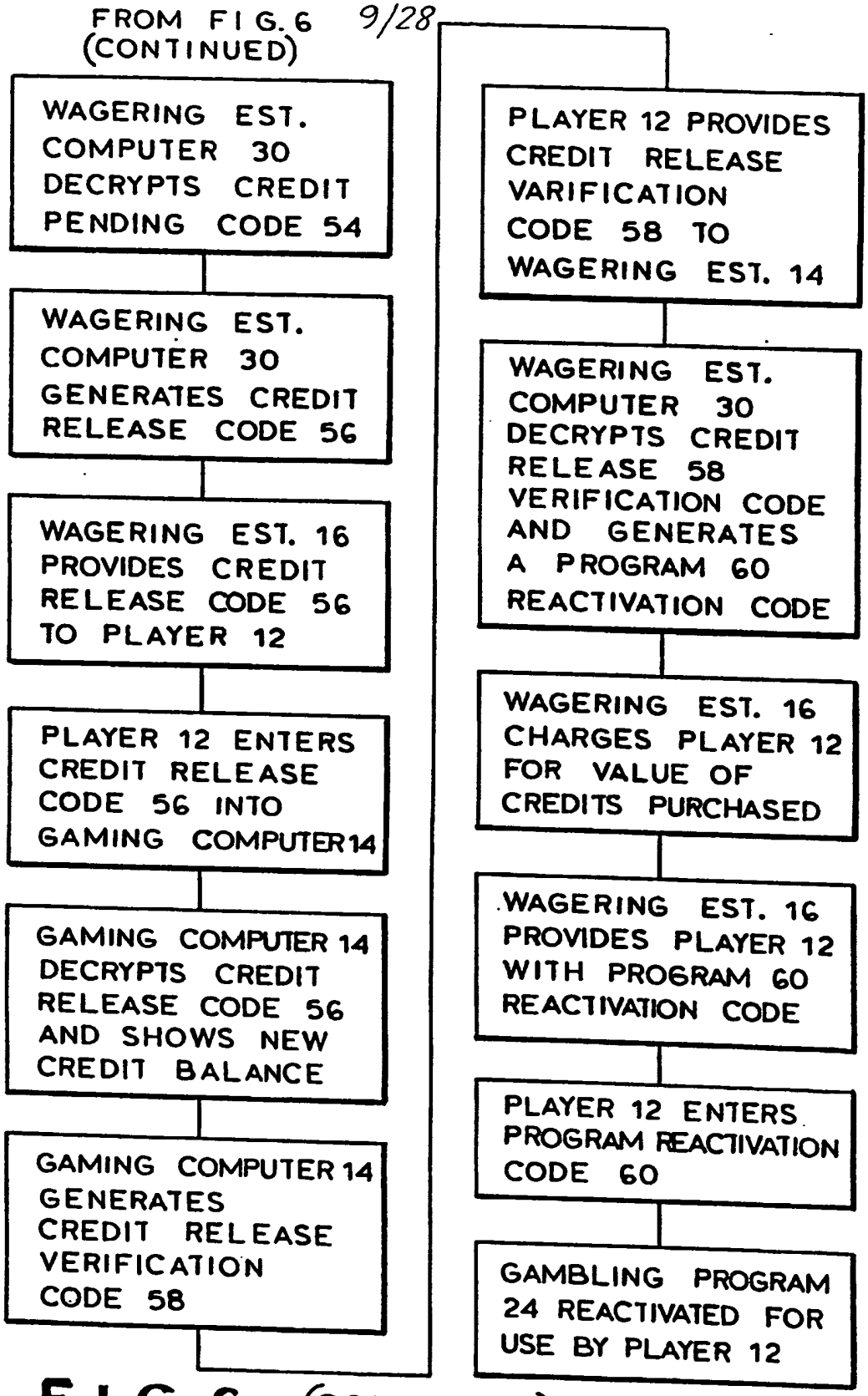


FIG. 6 (CONTINUED)

FIG. 7A

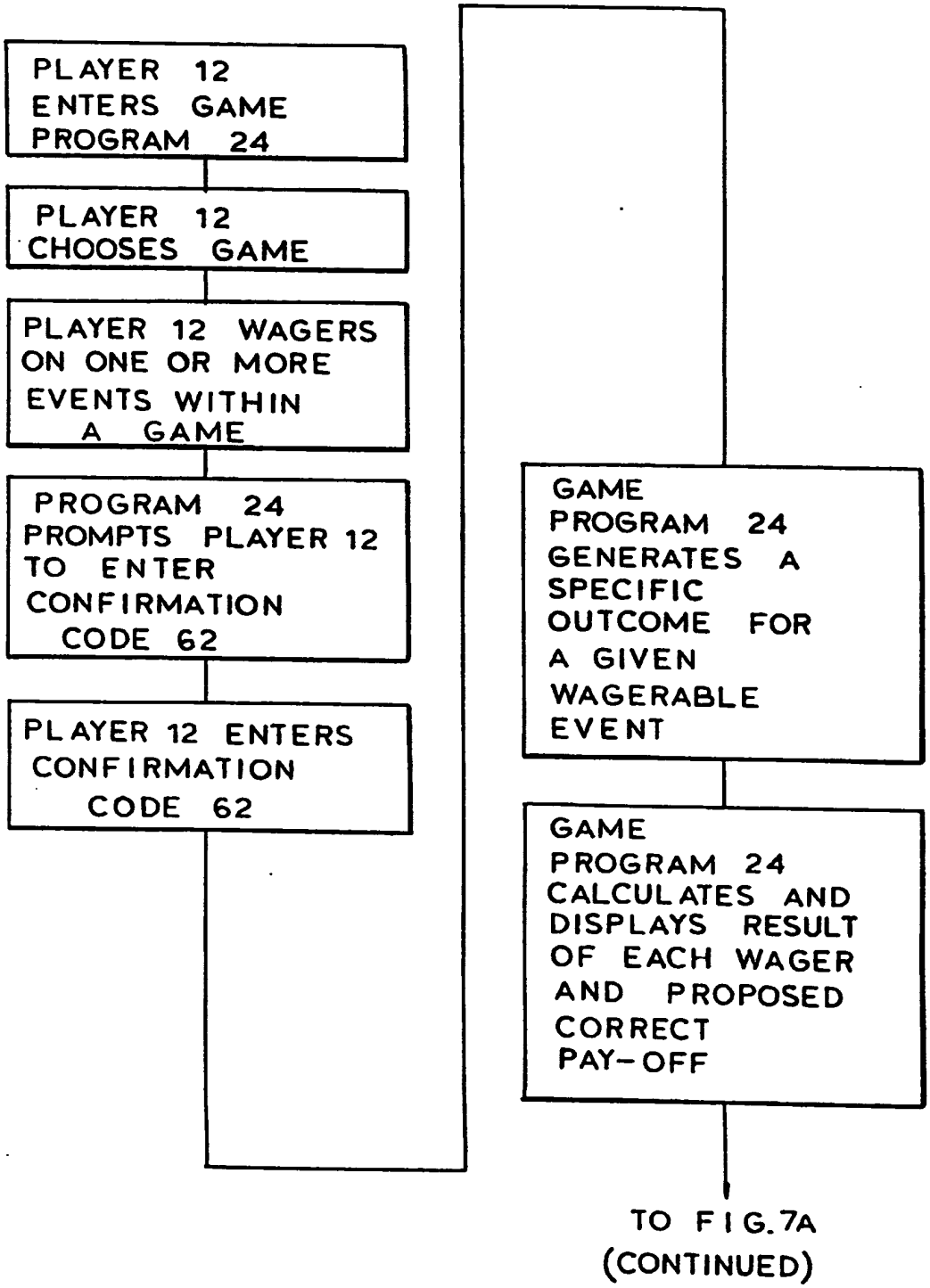

PLAYER 12 ENTERS GAME PROGRAM 24
PLAYER 12 CHOOSES GAME
PLAYER 12 WAGERS ON ONE OR MORE EVENTS WITHIN A GAME
PROGRAM 24 PROMPTS PLAYER 12 TO ENTER CONFIRMATION CODE 62
PLAYER 12 ENTERS CONFIRMATION CODE 62
GAME PROGRAM 24 GENERATES A SPECIFIC OUTCOME FOR A GIVEN WAGERABLE EVENT
GAME PROGRAM 24 CALCULATES AND DISPLAYS RESULT OF EACH WAGER AND PROPOSED CORRECT PAY-OFF
TO FIG. 7A (CONTINUED)

FIG. 7A
(CONTINUED)

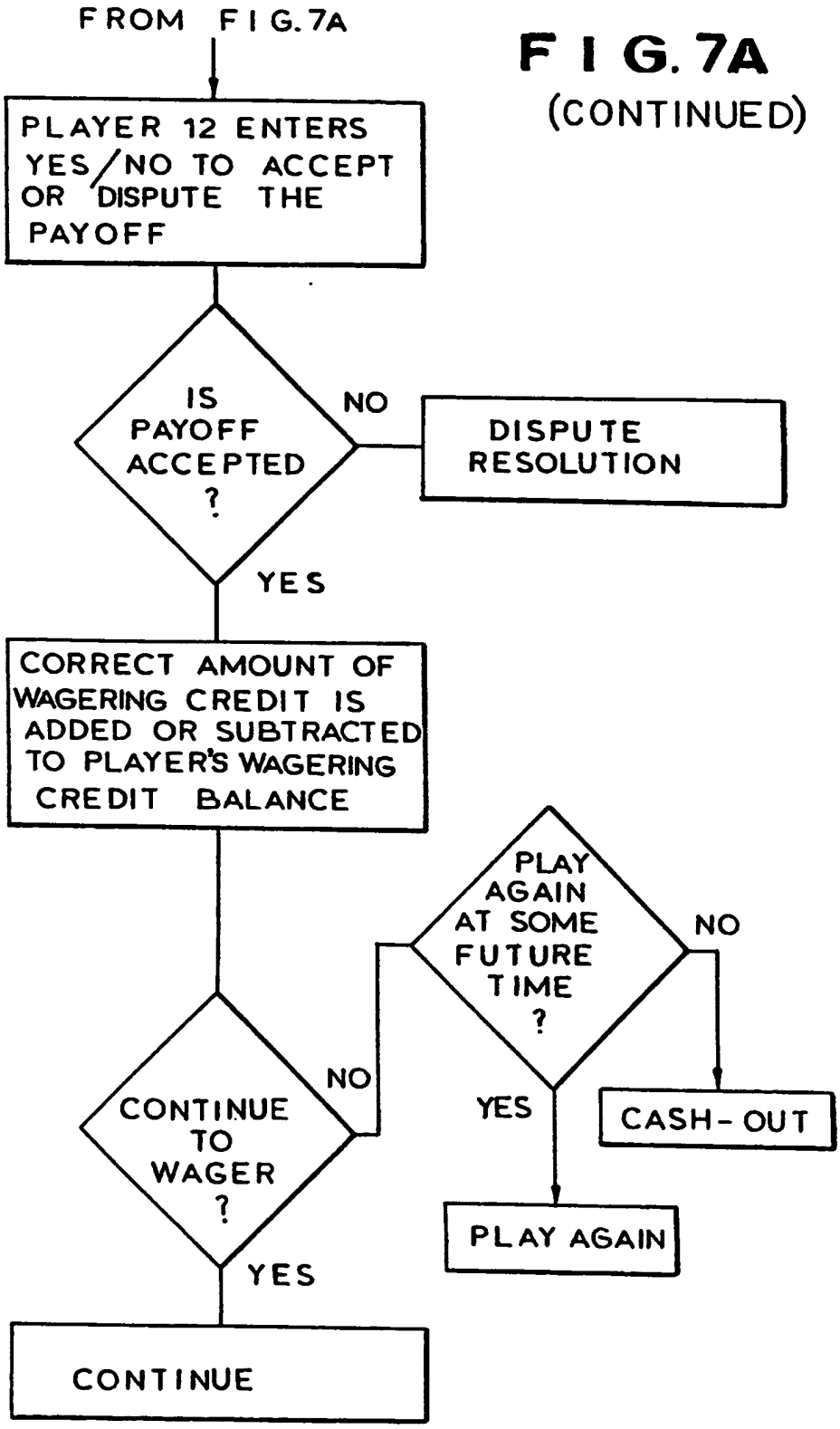


FIG. 7B-1

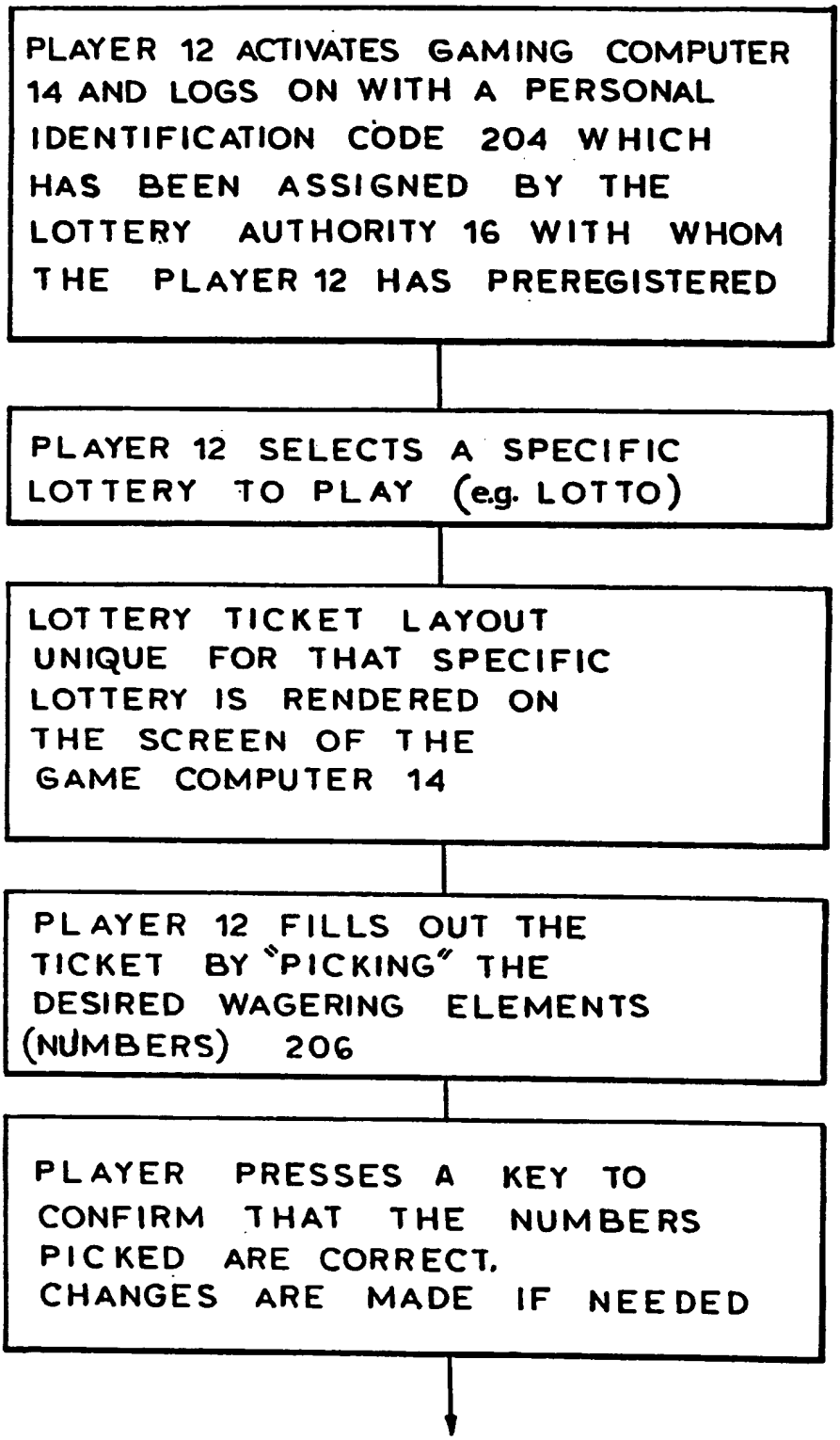

PLAYER 12 ACTIVATES GAMING COMPUTER 14 AND LOGS ON WITH A PERSONAL IDENTIFICATION CODE 204 WHICH HAS BEEN ASSIGNED BY THE LOTTERY AUTHORITY 16 WITH WHOM THE PLAYER 12 HAS PREREGISTERED
PLAYER 12 SELECTS A SPECIFIC LOTTERY TO PLAY (e.g. LOTTO)
LOTTERY TICKET LAYOUT UNIQUE FOR THAT SPECIFIC LOTTERY IS RENDERED ON THE SCREEN OF THE GAME COMPUTER 14
PLAYER 12 FILLS OUT THE TICKET BY "PICKING" THE DESIRED WAGERING ELEMENTS (NUMBERS) 206
PLAYER PRESSES A KEY TO CONFIRM THAT THE NUMBERS PICKED ARE CORRECT. CHANGES ARE MADE IF NEEDED
TO FIG. 7B-2

FIG. 7B-2

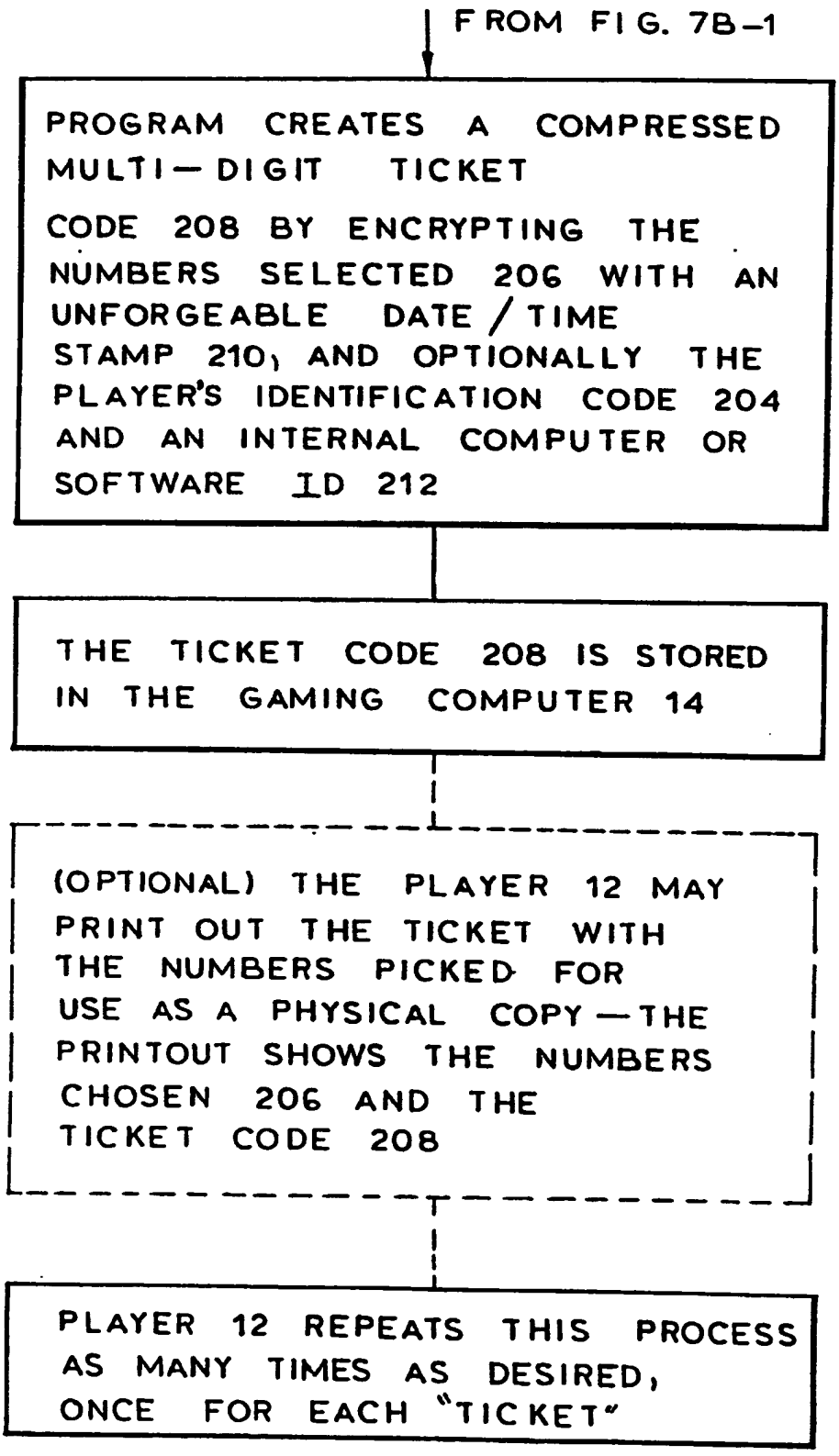
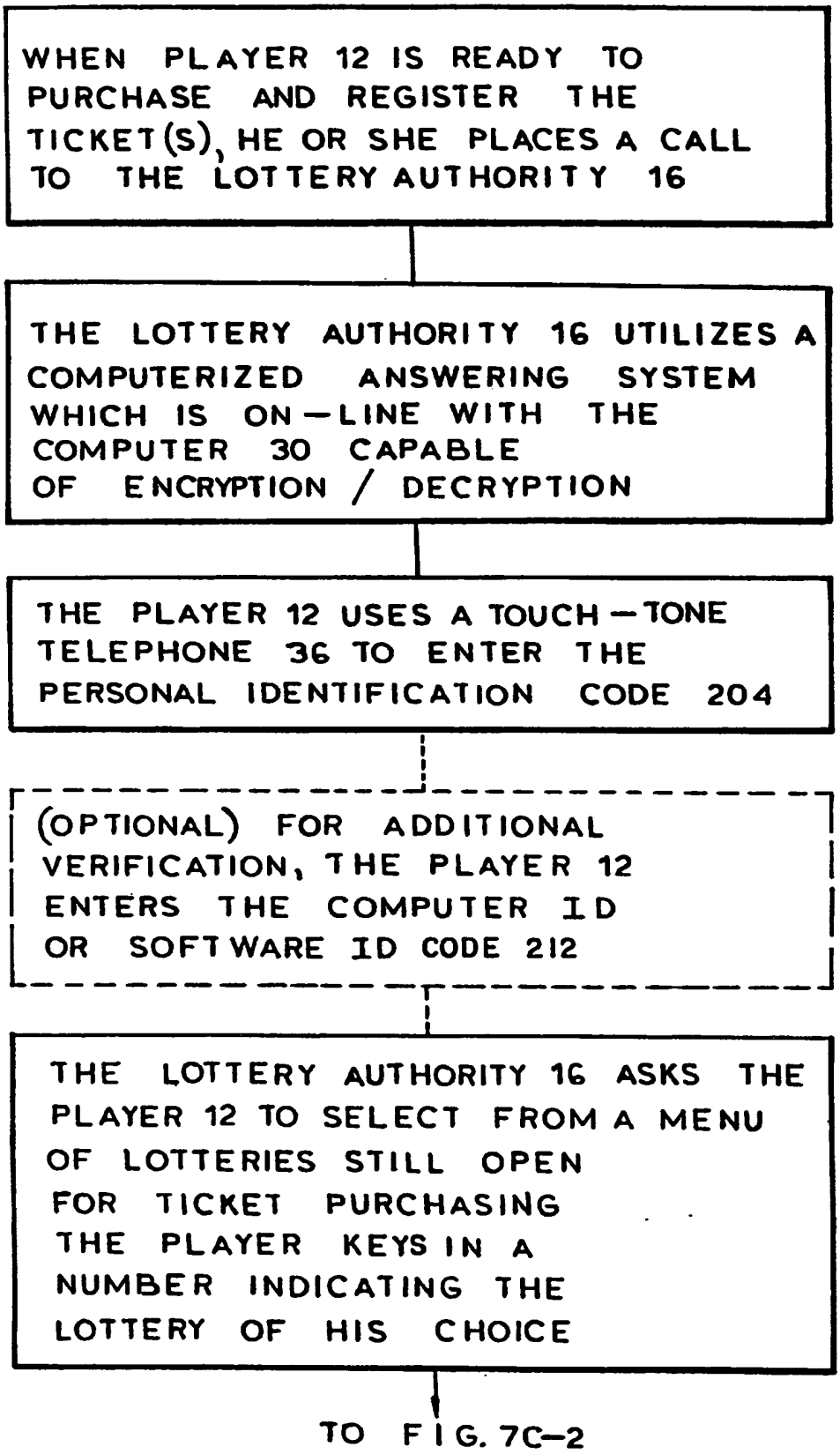

FROM FIG. 7B-1
PROGRAM CREATES A COMPRESSED MULTI-DIGIT TICKET CODE 208 BY ENCRYPTING THE NUMBERS SELECTED 206 WITH AN UNFORGEABLE DATE/TIME STAMP 210, AND OPTIONALLY THE PLAYER'S IDENTIFICATION CODE 204 AND AN INTERNAL COMPUTER OR SOFTWARE ID 212
THE TICKET CODE 208 IS STORED IN THE GAMING COMPUTER 14
(OPTIONAL) THE PLAYER 12 MAY PRINT OUT THE TICKET WITH THE NUMBERS PICKED FOR USE AS A PHYSICAL COPY — THE PRINTOUT SHOWS THE NUMBERS CHOSEN 206 AND THE TICKET CODE 208
PLAYER 12 REPEATS THIS PROCESS AS MANY TIMES AS DESIRED, ONCE FOR EACH "TICKET"

FIG. 7C-1



TO FIG. 7C-2

FIG. 7C-2 15/28

FROM FIG. 7C-1

THE PLAYER 12 INDICATES HOW HIS TICKETS ARE TO BE PAID FOR. THE LOTTEY AUTHORITY 16 ACCEPTS OR DECLINES THE PLAYERS CHOICE OF PAYMENT METHOD. (IF DECLINED, THE CALL IS TRANSFERRED TO A LIVE OPERATOR)

THE PLAYER 12 ENTERS THE TICKET CODE 208. IF ENCRYPTED, THE ENCRYPTION ALGORITHM ENSURES THAT A RANDOMLY CREATED TICKET CODE 208 IS REVEALED AS FRAUDULENT.

IF ENCRYPTED, THE LOTTERY AUTHORITY 16 DECRYPTS THE TICKET CODE 208 TO ENSURE THAT IT REPRESENTS A SET OF VALID LOTTERY NUMBER CHOICES 206, AS WELL AS A VALID IDENTIFICATION CODE 204

(OPTIONAL) THE PLAYER 12 MAY ASK THE LOTTERY AUTHORITY 16 TO READ BACK THE NUMBERS EMBODIED IN THE TICKET CODE 208. THE LOTTERY AUTHORITY 16 DECRYPTS THE TICKET CODE 208 AND A COMPUTER GENERATED VOICE CONFIRMS THE PLAYER'S SELECTION OF

CONTINUED ON FIG. 7C-3

FIG. 7C-3

-----(CONTINUED FROM FIG. 7C-2)------

NUMBERS AS EMBODIED IN SUCH CODE- AT THIS POINT THE PLAYER 12 MAY, FOR ANY REASON, CHOOSE TO CANCEL THIS "TICKET". AND GO ON TO REGISTERING THE NEXT "TICKET"

IF THE TICKET CODE 208 IS VALID, THEN A REGISTRATION CODE 218 IS CREATED BY AN ALGORITHM ONLY TO THE LOTTERY AUTHORITY 16. REGISTRATION CODE 218 INCORPORATES BOTH THE ORIGINAL TICKET CODE 208 AND A CURRENT DATE/TIME STAMP 220. THE LOTTERY AUTHORITY 16 PROVIDES THE REGISTRATION CODE 218 TO THE PLAYER 12 AND STORES THE SAME IN THE LOTTERY AUTHORITY COMPUTER 30 FOR FUTURE REFERENCE

(OPTIONAL) THE LOTTERY AUTHORITY 16 MAY AT THIS POINT ASK THE PLAYER 12 TO CONFIRM THE PURCHASE OF THIS TICKET BY ENTERING A YES/NO DIGIT-ONCE CONFIRMED THE "TICKET" IS NON-REFUNDABLE

TO FIG. 7C-4

FIG. 7C-4

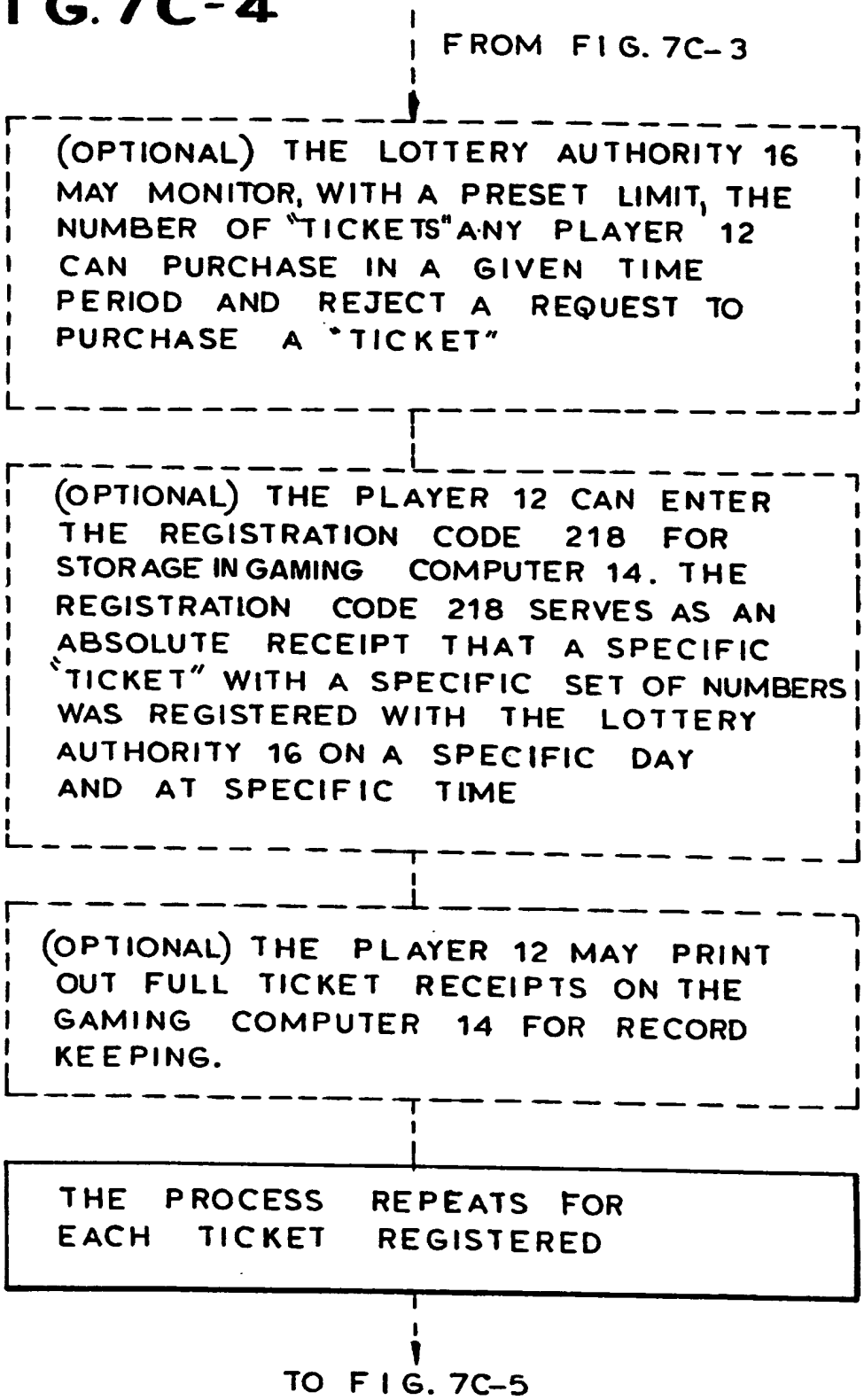

FROM FIG. 7C-3
(OPTIONAL) THE LOTTERY AUTHORITY 16 MAY MONITOR, WITH A PRESET LIMIT, THE NUMBER OF "TICKETS" ANY PLAYER 12 CAN PURCHASE IN A GIVEN TIME PERIOD AND REJECT A REQUEST TO PURCHASE A "TICKET"
(OPTIONAL) THE PLAYER 12 CAN ENTER THE REGISTRATION CODE 218 FOR STORAGE IN GAMING COMPUTER 14. THE REGISTRATION CODE 218 SERVES AS AN ABSOLUTE RECEIPT THAT A SPECIFIC "TICKET" WITH A SPECIFIC SET OF NUMBERS WAS REGISTERED WITH THE LOTTERY AUTHORITY 16 ON A SPECIFIC DAY AND AT SPECIFIC TIME
(OPTIONAL) THE PLAYER 12 MAY PRINT OUT FULL TICKET RECEIPTS ON THE GAMING COMPUTER 14 FOR RECORD KEEPING.
THE PROCESS REPEATS FOR EACH TICKET REGISTERED
TO FIG. 7C-5

FIG. 7C-5

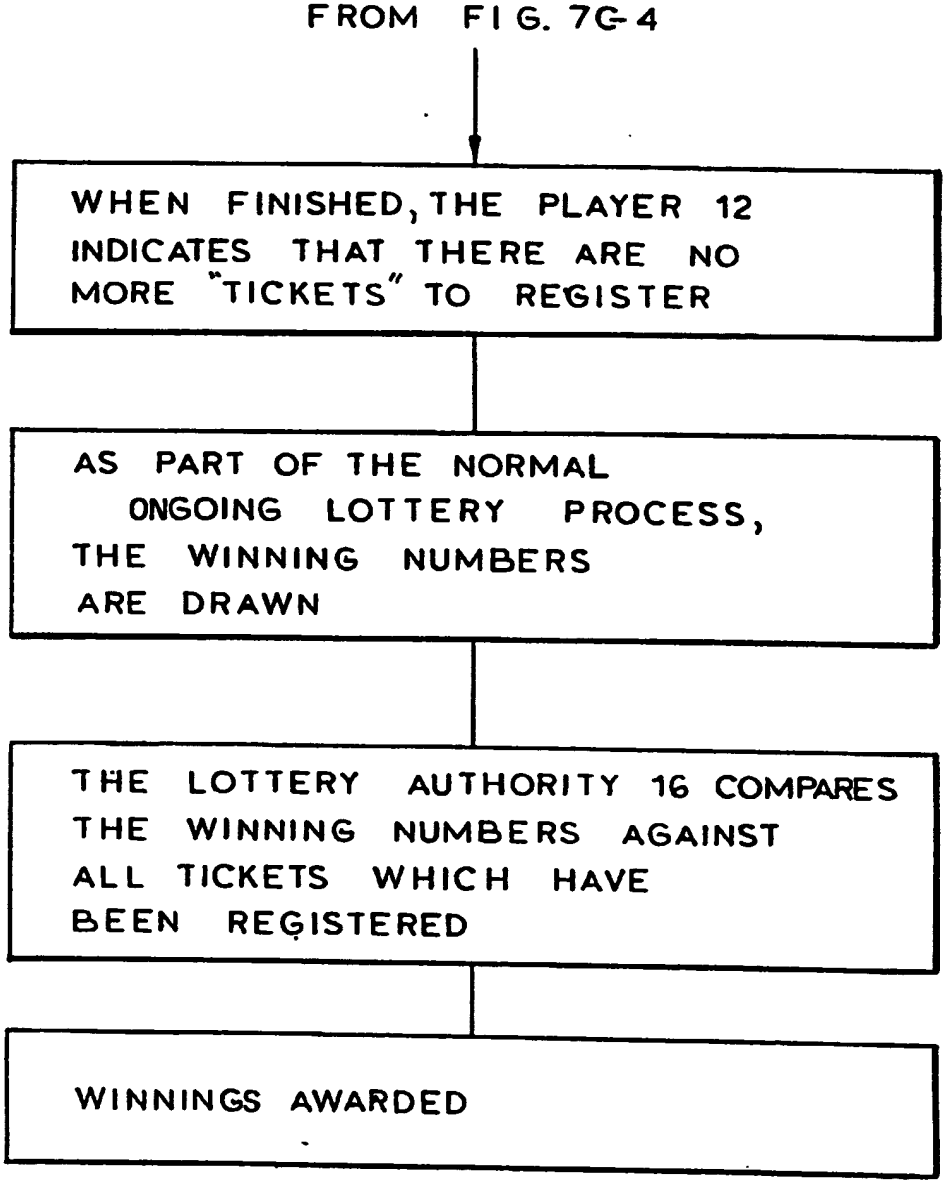
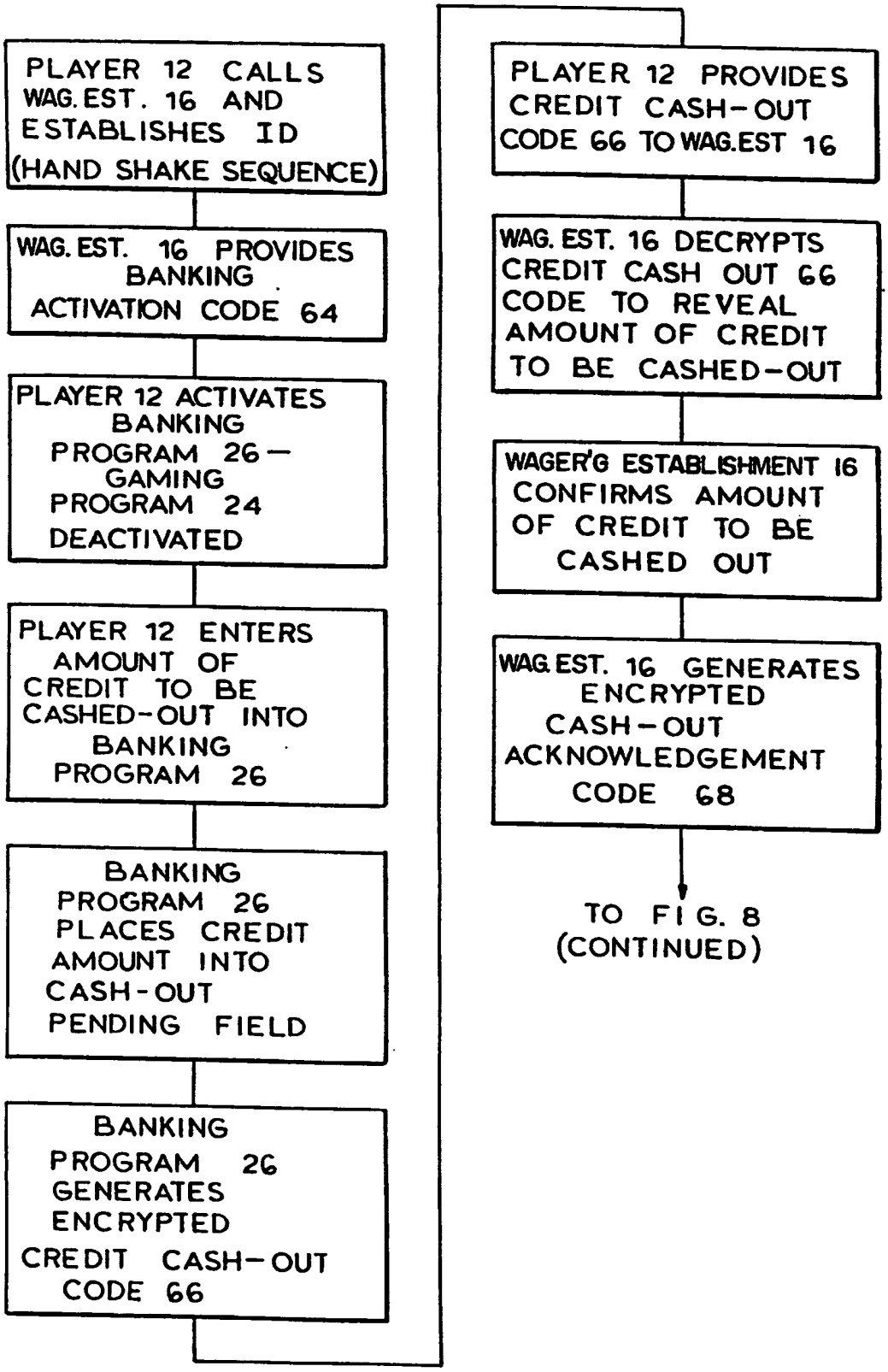

FROM FIG. 7C-4
WHEN FINISHED, THE PLAYER 12 INDICATES THAT THERE ARE NO MORE "TICKETS" TO REGISTER
AS PART OF THE NORMAL ONGOING LOTTERY PROCESS, THE WINNING NUMBERS ARE DRAWN
THE LOTTERY AUTHORITY 16 COMPARES THE WINNING NUMBERS AGAINST ALL TICKETS WHICH HAVE BEEN REGISTERED
WINNINGS AWARDED

FIG. 8


PLAYER 12 CALLS WAG. EST. 16 AND ESTABLISHES ID (HAND SHAKE SEQUENCE)
WAG. EST. 16 PROVIDES BANKING ACTIVATION CODE 64
PLAYER 12 ACTIVATES BANKING PROGRAM 26 — GAMING PROGRAM 24 DEACTIVATED
PLAYER 12 ENTERS AMOUNT OF CREDIT TO BE CASHED-OUT INTO BANKING PROGRAM 26
BANKING PROGRAM 26 PLACES CREDIT AMOUNT INTO CASH-OUT PENDING FIELD
BANKING PROGRAM 26 GENERATES ENCRYPTED CREDIT CASH-OUT CODE 66
PLAYER 12 PROVIDES CREDIT CASH-OUT CODE 66 TO WAG. EST 16
WAG. EST. 16 DECRYPTS CREDIT CASH OUT 66 CODE TO REVEAL AMOUNT OF CREDIT TO BE CASHED-OUT
WAGER'G ESTABLISHMENT 16 CONFIRMS AMOUNT OF CREDIT TO BE CASHED OUT
WAG. EST. 16 GENERATES ENCRYPTED CASH-OUT ACKNOWLEDGEMENT CODE 68
TO FIG. 8 (CONTINUED)

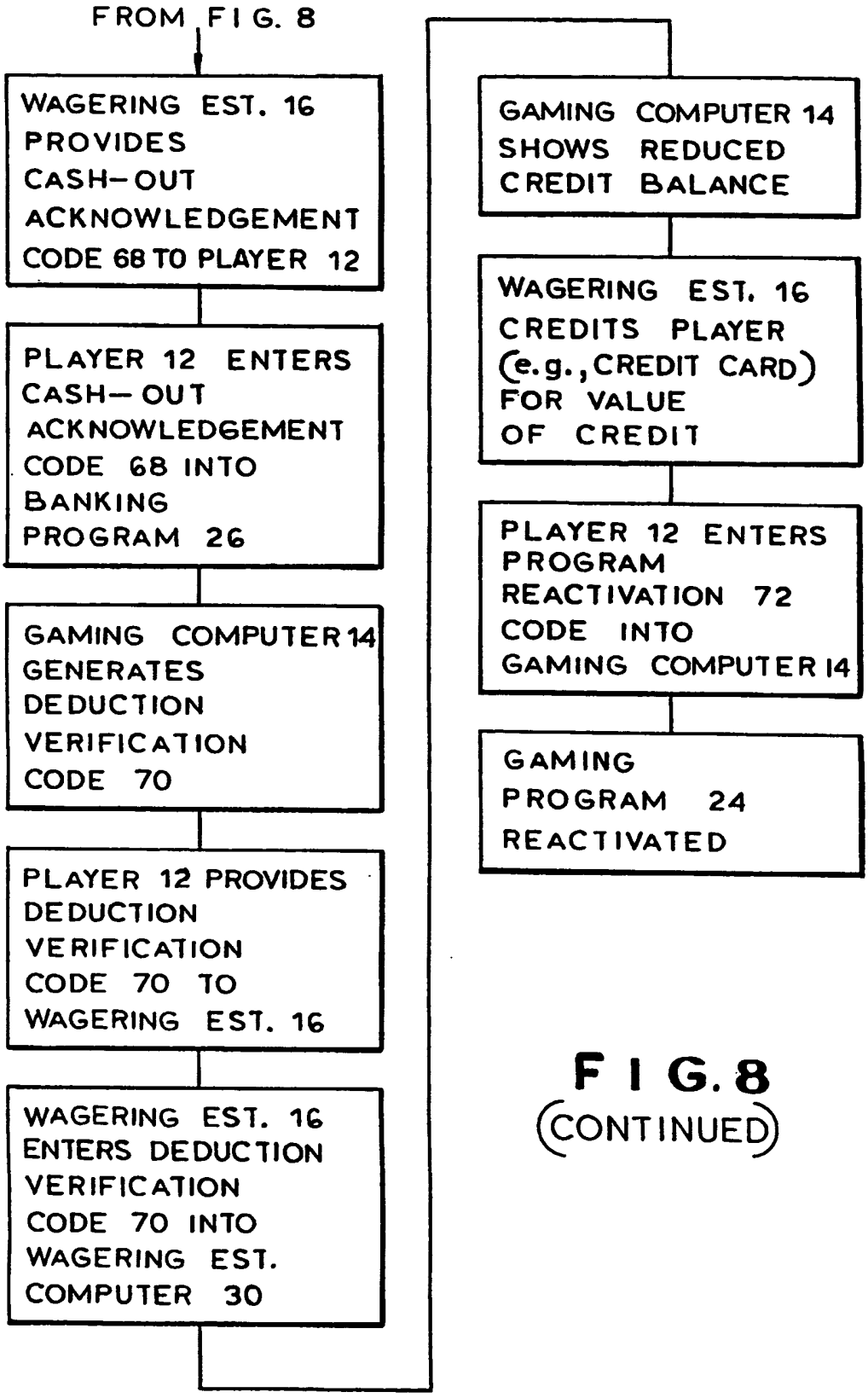
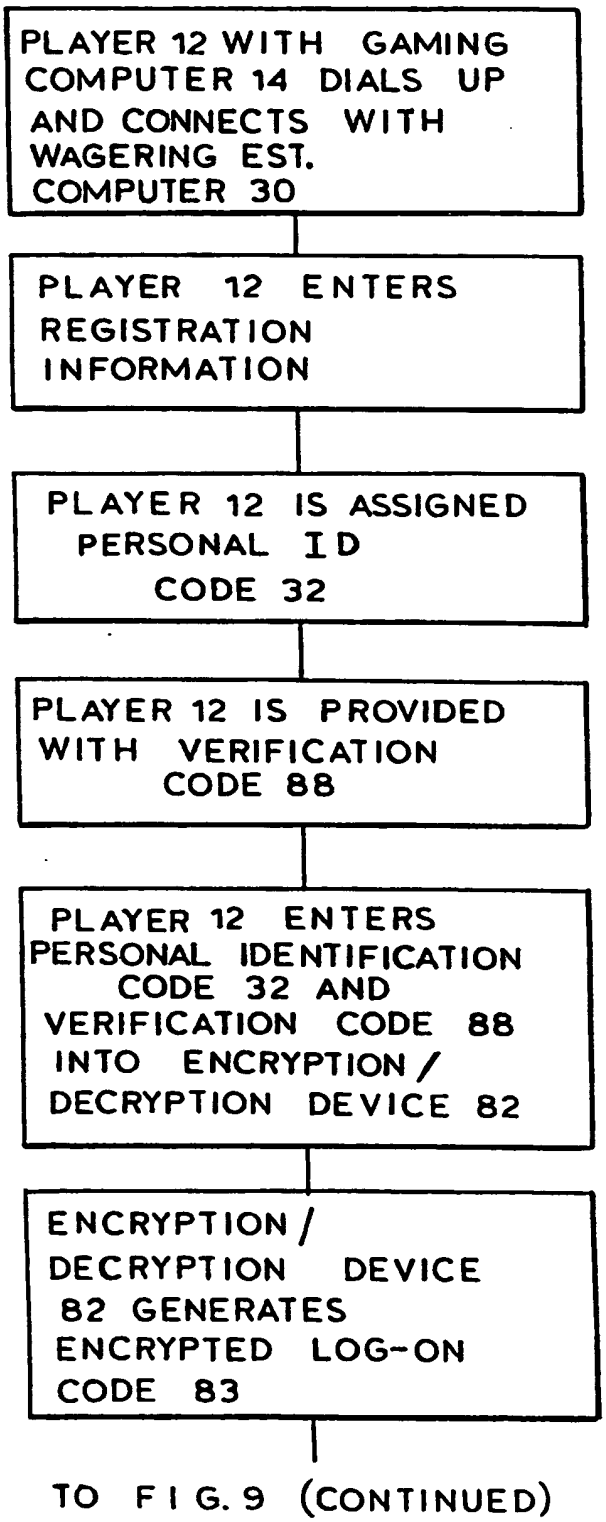


FIG. 8
(CONTINUED)

FIG. 9


PLAYER 12 WITH GAMING COMPUTER 14 DIALS UP AND CONNECTS WITH WAGERING EST. COMPUTER 30
PLAYER 12 ENTERS REGISTRATION INFORMATION
PLAYER 12 IS ASSIGNED PERSONAL ID CODE 32
PLAYER 12 IS PROVIDED WITH VERIFICATION CODE 88
PLAYER 12 ENTERS PERSONAL IDENTIFICATION CODE 32 AND VERIFICATION CODE 88 INTO ENCRYPTION / DECRYPTION DEVICE 82
ENCRYPTION / DECRYPTION DEVICE 82 GENERATES ENCRYPTED LOG-ON CODE 83
TO FIG. 9 (CONTINUED)

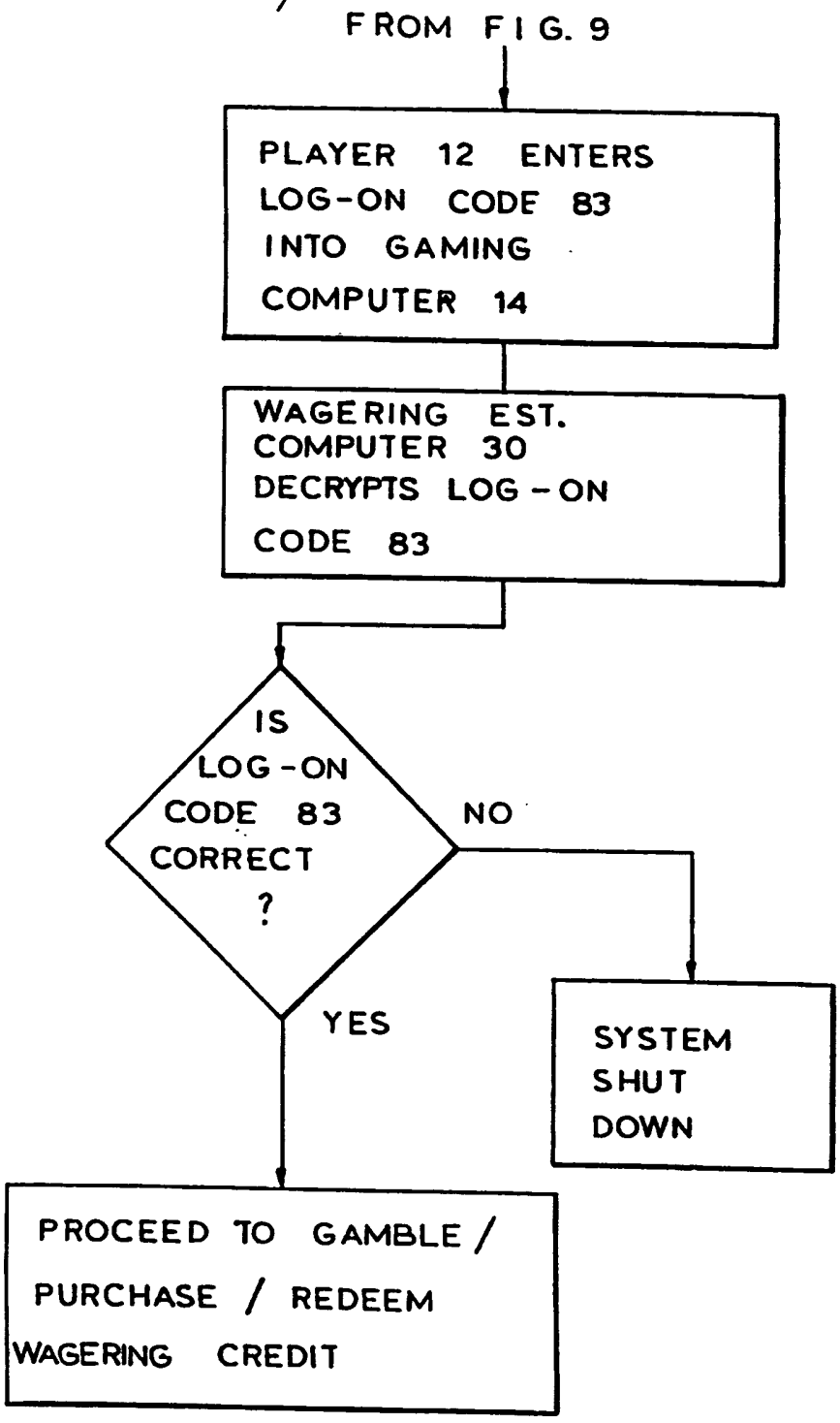


FIG. 9 (CONTINUED)

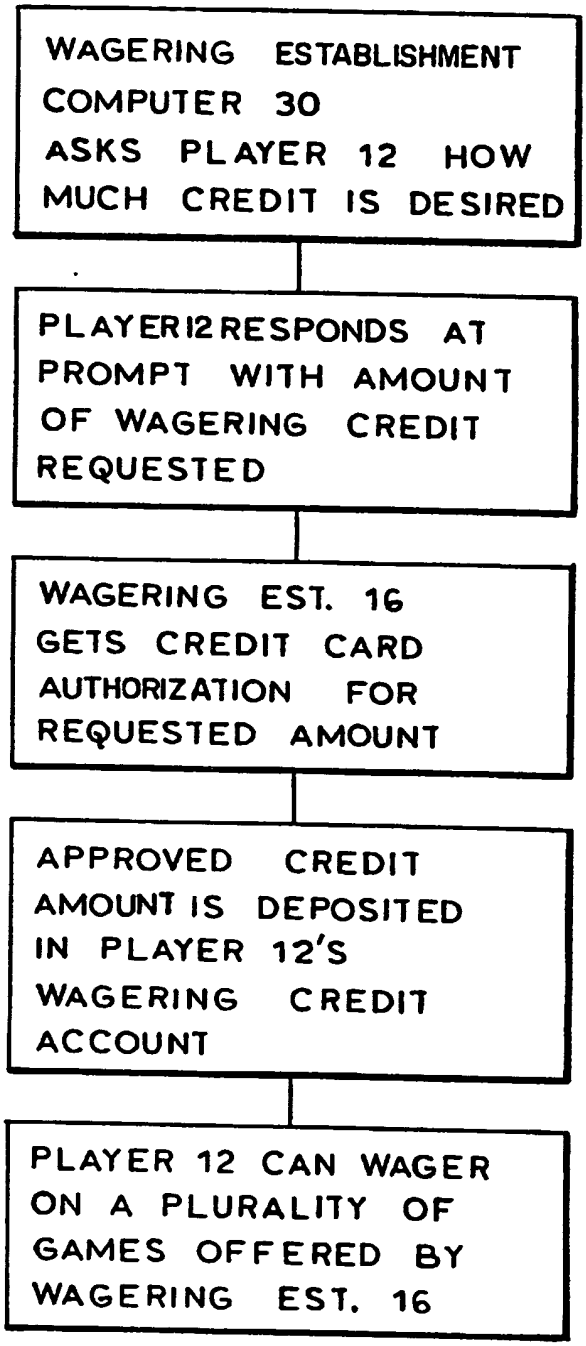

WAGERING ESTABLISHMENT COMPUTER 30 ASKS PLAYER 12 HOW MUCH CREDIT IS DESIRED
PLAYER12RESPONDS AT PROMPT WITH AMOUNT OF WAGERING CREDIT REQUESTED
WAGERING EST. 16 GETS CREDIT CARD AUTHORIZATION FOR REQUESTED AMOUNT
APPROVED CREDIT AMOUNT IS DEPOSITED IN PLAYER 12'S WAGERING CREDIT ACCOUNT
PLAYER 12 CAN WAGER ON A PLURALITY OF GAMES OFFERED BY WAGERING EST. 16

FIG. 10

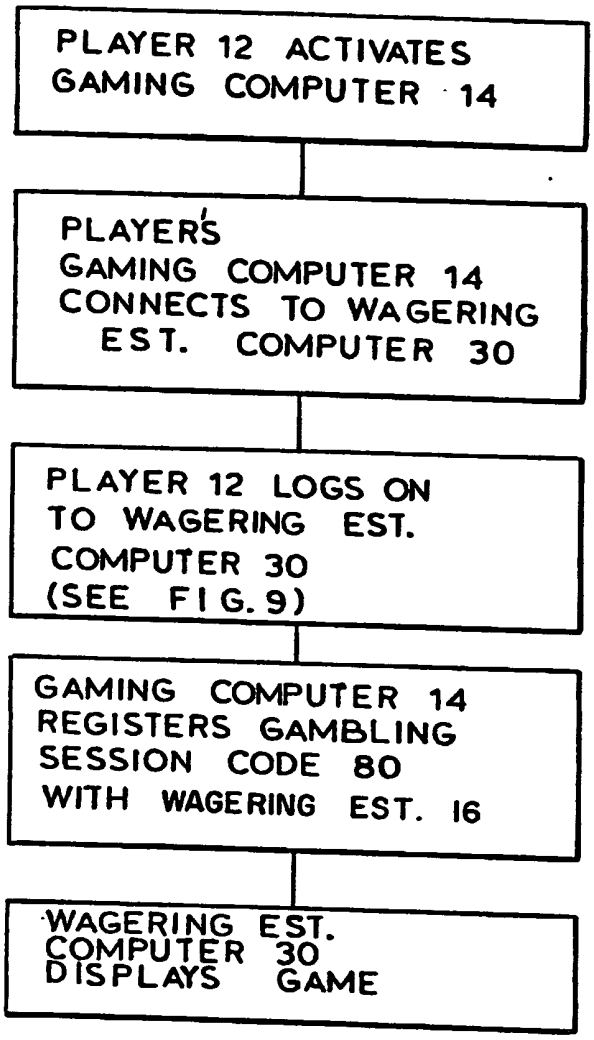

PLAYER 12 ACTIVATES GAMING COMPUTER 14
PLAYER'S GAMING COMPUTER 14 CONNECTS TO WAGERING EST. COMPUTER 30
PLAYER 12 LOGS ON TO WAGERING EST. COMPUTER 30 (SEE FIG. 9)
GAMING COMPUTER 14 REGISTERS GAMBLING SESSION CODE 80 WITH WAGERING EST. 16
WAGERING EST. COMPUTER 30 DISPLAYS GAME

FIG. 11

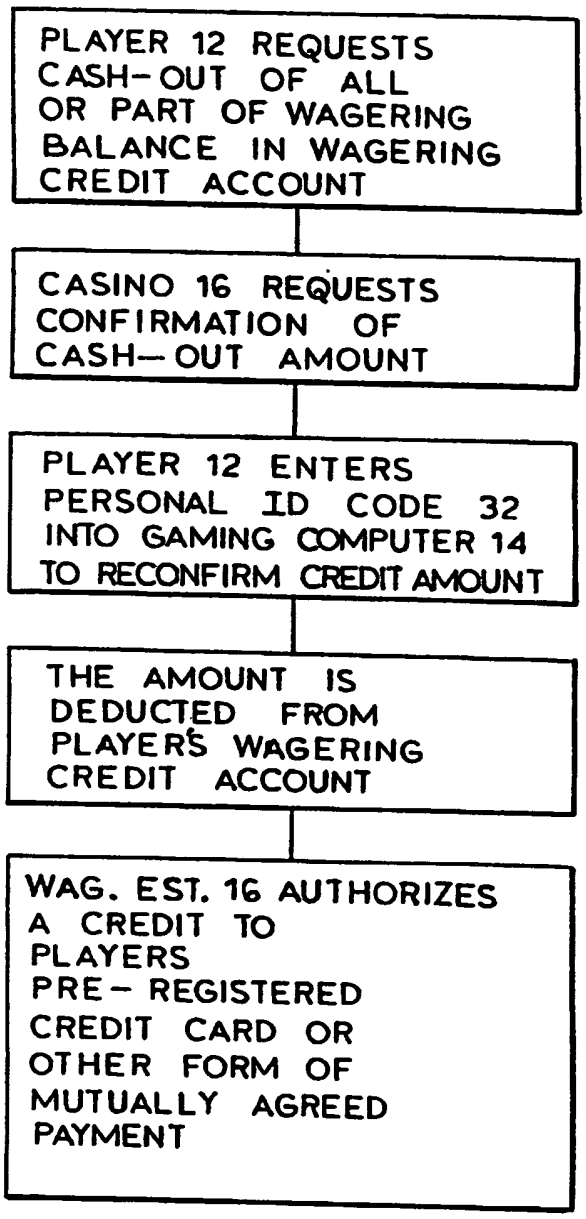

PLAYER 12 REQUESTS CASH-OUT OF ALL OR PART OF WAGERING BALANCE IN WAGERING CREDIT ACCOUNT
CASINO 16 REQUESTS CONFIRMATION OF CASH-OUT AMOUNT
PLAYER 12 ENTERS PERSONAL ID CODE 32 INTO GAMING COMPUTER 14 TO RECONFIRM CREDIT AMOUNT
THE AMOUNT IS DEDUCTED FROM PLAYER'S WAGERING CREDIT ACCOUNT
WAG. EST. 16 AUTHORIZES A CREDIT TO PLAYERS PRE-REGISTERED CREDIT CARD OR OTHER FORM OF MUTUALLY AGREED PAYMENT

FIG.12

FIG.13

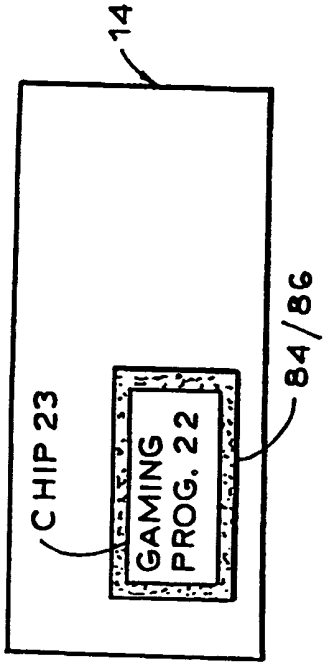

14
CHIP 23
GAMING PROG. 22
84/86

FIG.14

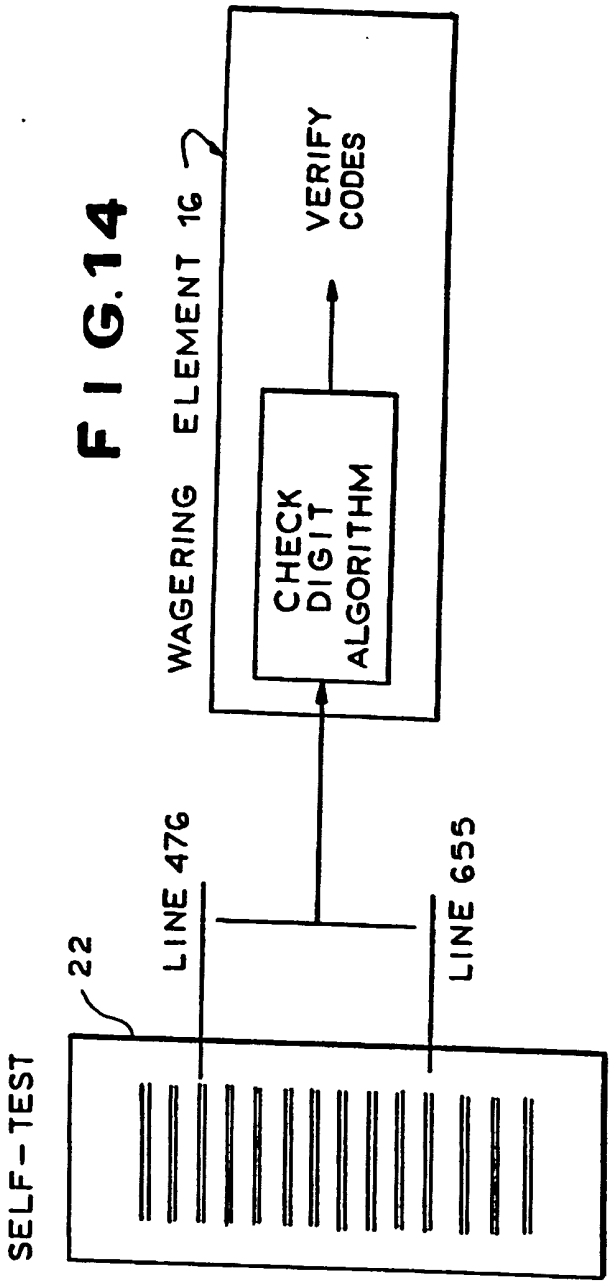

WAGERING ELEMENT 16
VERIFY CODES
CHECK DIGIT ALGORITHM
LINE 476
LINE 655
22
SELF-TEST

FIG.15A

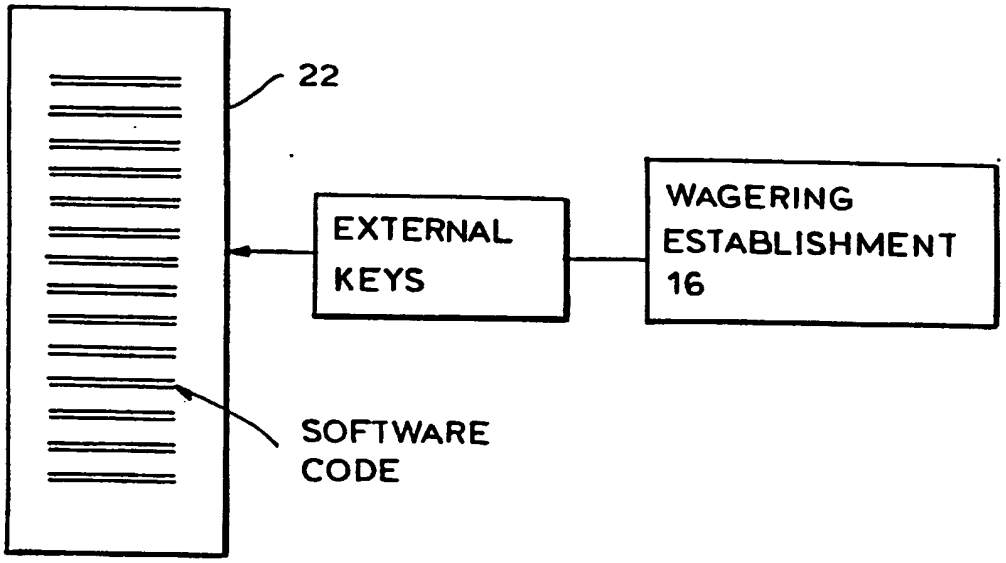


FIG.15B

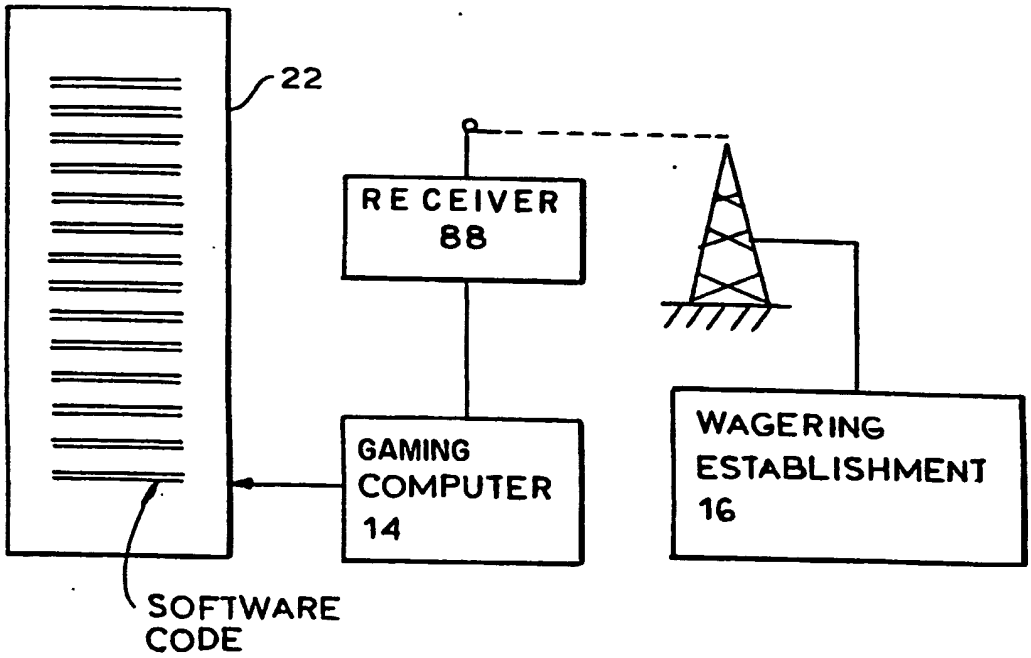


FIG.15C

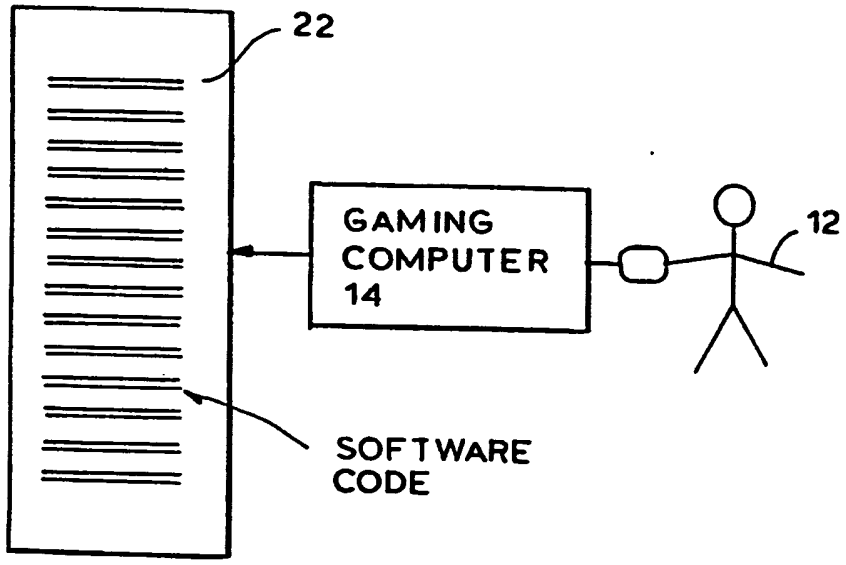
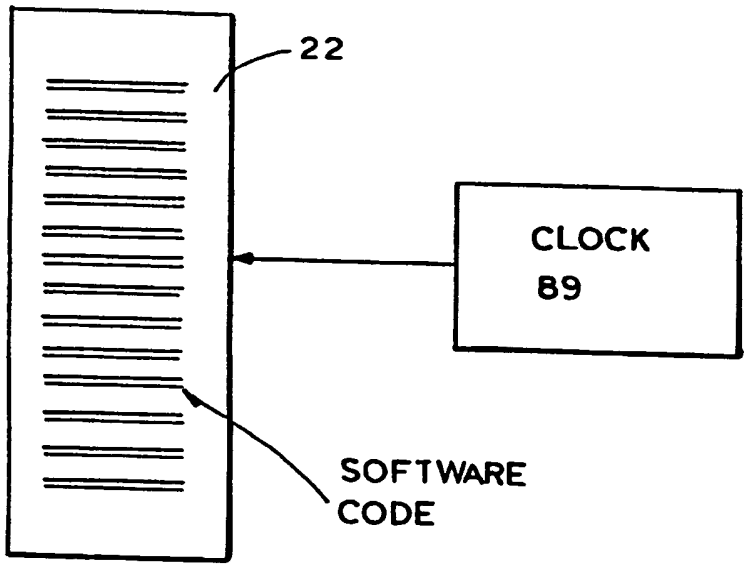


FIG.15D



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/02939

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 155:00, 161:00
US CL : 364/442; 273/138A
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/410-412; 273/138A, 138R, 433-435; 380/3, 4, 22-25; 235/375, 379, 380, 381; 382/2, 4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,038,022 (LUCERO) 06 August 1991, see the abstract, figs. 1-4, and col. 3 line 14 to col. 4 line 20.	1-30
Y	US, A, 4,317,957 (SENDROW) 02 March 1982; see the abstract and fig. 2.	1-30
Y	US, A, 5,083,271 (THACHER ET AL) 21 January 1992, see the abstract, fig. 1 and col. 2 lines 29-66.	10-11, 17-20
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[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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12 MAY 1995	08 JUN 1995
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer B. Hardy for ROBERT A. WEINHARDT Telephone No. (703) 305-3800

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INTERNATIONAL SEARCH REPORT

International application No.
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US, A, 5,351,970 (FIORETTI) 04 October 1994, see the abstract.	1-30
A,E	US, A, 5,413,357 (SCHULZE ET AL) 09 May 1995, see the abstract.	1-30